Water Resources Survey

Part I:

HISTORY OF LAND AND WATER USE ON IRRIGATED AREAS

and

Part II:

MAPS SHOWING IRRIGATED AREAS IN COLORS DESIGNATING THE SOURCES OF SUPPLY

Deer Lodge County, Montana

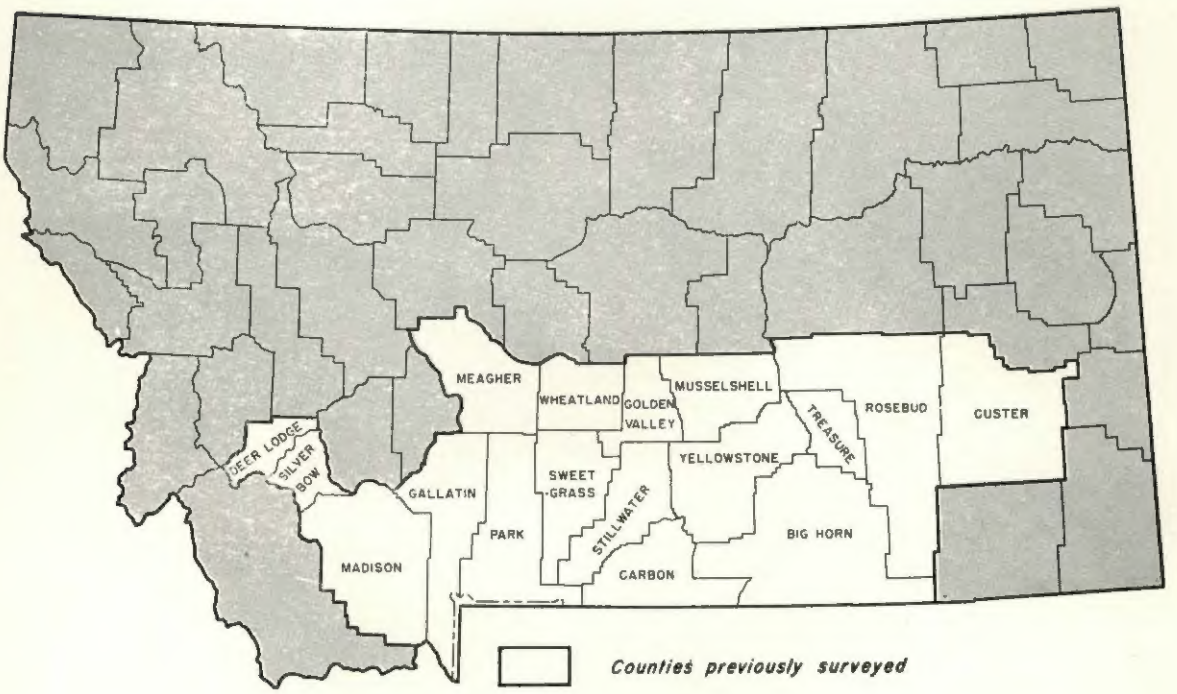
Published by
STATE ENGINEER'S OFFICE
Helena, Montana, June, 1955

WATER RESOURCES SURVEY

DEER LODGE COUNTY MONTANA

Part I

History of Land and Water Use on Irrigated Areas



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STATE ENGINEER'S OFFICE

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O. W. Monson, Irrigation Engineer, and Consultant, Bozeman

June, 1955

Honorable J. Hugo Aronson
Governor of Montana
Capitol Building
Helena, Montana

Dear Governor Aronson:

Submitted herewith is a consolidated report on the Water Resources Survey of Deer Lodge County, Montana.

This work is being carried on with funds made available to the State Engineer by the 33rd. Legislative Session, 1953, and in cooperation with the State Water Conservation Board and the Montana State Agricultural Experiment Station.

The report is divided into two parts. Part I consists of history of land and water use, irrigated lands, water rights, etc., and Part II contains the township maps in the county showing in color the lands irrigated from each source or canal system.

Work has been completed and reports are now available for the following counties: Yellowstone, Carbon, Stillwater, Big Horn, Custer, Rosebud, Musselshell, Golden Valley, Wheatland, Meagher, Sweet Grass, Park, Treasure, Gallatin, Madison, Silver Bow, and Deer Lodge.

The office files contain minute descriptions and details of each individual water right, water and land use, etc., which are too voluminous to be included herein. These office files are available for inspection to those who are interested.

The historical data on water rights contained in this report can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up to date.

Respectfully submitted,

FRED E. BUCK, State Engineer

ACKNOWLEDGMENTS

A survey and study of water resources involves many phases of both field and office work in order to gather the necessary data to make the information complete and comprehensive. Appreciation of the splendid cooperation of various agencies and individuals who gave their time and assistance in aiding us in gathering the data for the preparation of this report is here acknowledged.

Deer Lodge County Officials

Robert J. Daly, Commissioner

Leo F. Scalise, Commissioner — Florence Podobnik, Commissioner

May H. McGinty, Clerk and Recorder

Frank B. McGrath, Clerk of District Court — Charles Unti, Assessor

---

History and Organization.....Montana Writers' W. P. A. Project

Dr. Merrill G. Burlingame—
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"Climate" .....State Climatologist

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"Soils".....Research Associate, Agricultural Experiment Station

J. G. Jones—"Crops and Livestock".....County Agent

Frank Stermitz—"Stream Gaging Stations".....U. S. Geological Survey

U. M. Sahinen—
"Mining".....Chief of Information & Service, Montana School of Mines

A. S. Erickson—"Soil Conservation Districts".....Work Unit Conservationist

A. E. Tangen—"Anaconda State Fish Hatchery".....Field Superintendent

Ray West—"Deer Lodge National Forest"..District Forest Ranger, Anaconda

Wilmer S. Fewins.....Secretary, Mill Creek Irrigation Co.

The State Engineer's Office, Water Resources Survey, hereby expresses sincere appreciation to the many ranchers, farmers, and stockmen who have given their helpful cooperation in this survey.

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FOREWORD

In nearly all of the Western Reclamation States a water right is obtained by first making a filing with some legally designated central state agency—usually the State Engineer's Office—setting forth the amount of water desired and the area proposed to be irrigated. A study is made of the sufficiency of the water supply, and, if found adequate, a permit for the use of the water is issued and recorded. If studies show that the stream is depleted, the application is denied. The procedure in Montana, however, is vastly different.

In Montana the right to the use of water from a stream not adjudicated by the courts may be acquired in one of two ways. First, by posting a notice on the stream and filing a copy of same in the office of the County Clerk of the county wherein the appropriation is located and then proceeding to divert and use the water. Secondly, a person may divert and use water from a stream without posting or filing notice in which case a water right based thereon has been recognized as valid by the courts. Whenever it becomes necessary to adjudicate the stream both methods of acquiring rights have been recognized by the courts and the amount of water finally decreed and dates of priority in either case are determined by the evidences and proofs.

Under Montana law there is no restriction as to the amount of water one may designate in his notice of appropriation. As a consequence, the amount set forth in the filing in no way indicates the amount being diverted and used or does it show whether the water was ever used at all to perfect the right. Furthermore, there is no relationship whatsoever between the amount of water filed on and the normal flow of the stream. To further complicate this matter there is no law of abandonment in Montana. Action must be brought in court to abandon a right, which makes it almost impossible to prove abandonment if the defendant wishes to oppose the action.

There is no central office in the State where recordings are filed, or any supervision over the distribution of water from unadjudicated streams. The distribution of water from adjudicated streams is supervised entirely by the District Court that handed down the decree. One wishing to study the validity of a water right on stream not adjudicated must make a search of the county records wherein the stream is located in perhaps two, three, or more counties if the stream courses through them. About the only result one will accomplish by such a research will be a tabulation of the dates of filing. The amounts of water filed on will be of no consequence since there is no conclusive evidence that the recorded appropriations have been perfected, or is there any documentary evidence of the rights which are being used but never recorded. Therefore, a purchaser of ranch property, where he has to depend upon irrigation from a stream that is not adjudicated, has no way of determining the validity or priority of his water right. He has no assurance of the value of the right until the stream is adjudicated by the court, when each claimant must prove his claim by material witnesses.

The pioneers who are able to offer direct testimony in adjudication suits are rapidly passing. One phase of this Water Resources Survey is to obtain all of the first-hand information possible on water and land use from the "old-timers" who are left, before it is too late. These data will include every known water right up to the time of completing the work in the respective counties and the information is on file for inspection in the State Engineer's Office. At the time of this publication, work has been completed and reports are available for the following counties: Yellowstone, Carbon, Stillwater, Big Horn, Custer, Rosebud, Musselshell, Golden Valley,

Wheatland, Meagher, Sweet Grass, Park, Treasure, Gallatin, Madison, Deer Lodge, and Silver Bow. A person having interest in lands located in any one of the above-named counties may obtain a good idea of the sufficiency and priority of the water rights appurtenant to the land in question after studying the records in the State Engineer's Office.

In this and succeeding volumes of the data compiled by this Water Resources Survey, it is the intention to provide as much information as is possible relative to the water right records of the various counties, as well as to assemble such other information as may be available from all sources having knowledge of these various water rights. The location of the county where water right filings were first recorded presents a very difficult problem in compiling accurate verified water right information. In 1865, when Montana was still a territory, the area contained nine (9) original counties and by the time Montana became a state in 1889, the total of counties was increased to sixteen (16). During the period 1889 to 1895 this total changed to twenty-three; from 1895 to 1935 the total became thirty-five (35); and from 1935 to 1942 the number of counties created in Montana reached its present maximum of fifty-six (56). Throughout this evolution of counties there are many active recorded water right filings which have not been transcribed to the records of the county where they apply and are used today. Sometimes it is necessary to search the records of the original County, or subsequent County, in order to find water rights that have never been transcribed into the records of the present County. Every precaution is being taken to correct errors in the compilation of these data.

The results of this work, in the counties affected, proved to be very valuable and necessary in negotiating the Yellowstone River Compact between the states of Wyoming, North Dakota, and Montana. In arriving at an equitable division of the waters between the states, it was necessary for Montana to have a catalog of its irrigated land and water use. In the dispute with Canada over the use of water from Sage Creek, an international stream, the water resource survey played a very valuable part in justifying our uses for irrigation. This same question will undoubtedly arise in other river basins. It is highly important that Montana gather such data, and thereby be able to defend its water rights in the development of the great river basins of the Missouri and Columbia rivers and the international streams between Canada and Montana.

The subject of water rights is coming more and more into prominence as the rapid expansion of our irrigated area proceeds under the impetus of both State and Federal development programs. As new canals are dug and old canals and ditches are enlarged and extended, the relative area of land to be irrigated, compared to the water supply available for irrigation, becomes greater, and a competition for the limited water supply results, which often develops into controversy over the right of use of the water.

In a strict sense a water right does not imply ownership of the water in the same way as does a deed to a tract of land or a certificate of title to an automobile. A water right implies only the right to divert and use the water. Water when stored in a reservoir, however, is recognized as real property which may be sold or disposed of as desired by the owner. The ownership of the water of our rivers and streams rests in the State and the rules under which the State grants to the individual the right to use these waters are known as Water Right Laws.

The early settlers in Montana took up land under the provisions of the Homestead Law of 1862 and the Desert Land Act of 1877. The former Act gave 160 acres of land to anyone who settled on it and put it into cultivation. The latter deeded 640 acres of land to anyone who would irrigate it and pay the government $1.25 per acre. In 1890, filings under the Desert Land Act were reduced to 320 acres. The construction of ditches on desert claims was in compliance

for title to land rather than for irrigation, and little attention was paid to the water supply available. Consequently, miles of ditches were dug in Montana through which little or no water ever flowed. This is especially true in the drier parts of the state, where the diversions were made from intermittent streams.

In the more fertile mountain valleys irrigation was given more importance than in the plains country. Live streams provided a dependable source of water supply and the ditches which tapped them were designed to actually carry water, not merely to comply with a legal requirement to obtain title to a piece of land. Thus, the right to diversion and use of water for irrigation became as important as the acquisition of title to the land.

But, while the government granted a patent as evidence of title to the land upon proof of compliance with the Homestead Laws, there was no deed, certificate of title, or other legal instrument offered as evidence of title to a water right.

Water rights refer also to uses other than those for irrigation. Thus, the perfected right to the use of water for mining, power, fish hatcheries, bird refuges, recreational purposes, municipal needs, culinary supply and sewage disposal, manufacturing or navigation—all may become valid water rights.

The first irrigators took for granted their right to use water from creeks or rivers for irrigation. They saw water going to waste and appropriated it to their needs. It was as free to them as the air they breathed. They made no official record of the game they shot for food or the fish they caught in the streams and likewise considered it unnecessary to make official record of the time, place, or the amount of water diverted for irrigation. However, time has changed these conditions and it is now necessary to record the game killed and limit the fish catch in order to perpetuate game, and stock the streams. Likewise, it is becoming more and more necessary to file a claim for water appropriated from the streams and rivers for irrigation or other uses in order to protect the rights.

When game was plentiful, no one concerned himself with the number of deer a person killed, but when game became scarce, steps were taken to prevent a few persons from taking more than their share while others had to go without. To do this it became necessary to issue licenses or permits to kill game and also to keep a record of game killed—a practice which is still followed.

Likewise, when only a few settlers diverted water for irrigation and the supply was more than enough for all, no one was concerned about the exact amount used by any one person. But as more and more settlers constructed diversion dams and ditches and tapped the river and streams for irrigation water, it soon became evident that there would not be enough water for all. Thus, a year with low water brought disputes over the division of the supply. The older settlers, in such cases, demanded that the later comers close down their headgates and refrain from taking water, in order that the prior appropriations might have a full supply. The later users, on the other hand, insisted that the available supply be divided among all users so that all might share alike.

Thus, progressive over-development of irrigation, together with the occurrence of seasons of water shortage, combined to bring about the enactment of Water Right Laws in the Western States where irrigation is practiced.

METHOD OF SURVEY

Data incorporated in these reports were obtained by the office and field survey methods in cooperation with the irrigators on the lands.

Ownership plats are made up from the Courthouse records, after which field forms are prepared for each owner as they appear on the plats, showing the name of the owner, aerial photograph number and farm boundary. The appropriated and decreed water rights that fall within the ownership boundary are also platted on this field form. These water rights are then checked with the ownership and deeds in the Courthouse records to determine, if possible, the name of the present day water user. All the water right information is listed on the field form and later verified by the water user in a farm-by-farm survey.

For all irrigation systems water users are asked for specific information as to the source of water, present acreage irrigated, potentially irrigable acreage under existing works, seeped acreage, condition of irrigation system, type of system, and water supply.

The irrigated land classification practiced by this survey includes the following: All land normally irrigated within a two or three year period directly from an existing gravity ditch system; irrigated above a ditch by a sprinkler system; sub-irrigated due to ditch locations; or irrigated by pumping from streams, reservoirs, wells, sloughs, and sumps.

Potentially irrigable land classified by the survey is limited to those lands lying under existing ditches that have feasible qualifications necessary to become irrigated land. These qualifications include: water supply; seeped areas; land under ditches in need of repair; and abandoned ditches.

The information in regard to the location of the irrigation system, presently irrigated and potentially irrigable lands under existing works, is indicated on aerial photographs, with the exact location of each shown, and distinguished by color.

The data obtained by the field survey are mapped on township maps from the aerial photographs by means of projection. In addition to the information pertaining to irrigation, all culture, drainage, section lines, etc., is mapped in order to show accurate township plats for the area concerned. This information is then mapped by farm units on individual farm forms that show the farm boundary, the location and type of irrigation system, location of irrigated and potentially irrigable lands under the system, type of system and source of water. After these farm unit forms are completed, a summary is made of each township, which shows the name of the water user, section, township and range, source of water, whether a user has a private irrigation system or is under a ditch company or irrigation district, acreage irrigated from each source, present irrigated acreage, potentially irrigable acreage under existing facilities, and maximum irrigable acreage. The summary in these reports is then tabulated from the township summaries to show the totals for the county.

After this is accomplished and a final check made, color separation maps are drawn which includes from three to ten separation plates, depending upon the number of irrigation systems that appear in color on the final township map in Part II of the reports.

Section and township corner locations are obtained by the photogrammetric system, based on Government Land Office maps, county maps, plane table sheets and other sources.

So far as known this is the first survey of its kind ever to be ventured in the United States. The value of the work completed is well substantiated by giving Montana its first accurate and verified information concerning its water use and resources under existing irrigation facilities. New development of land for irrigation purposes, by State and Federal construction agencies, is not within the scope of this report. No effort is made to analyze economic possibilities, or the problems of the irrigation projects, or to make recommendations as to future development. The facts presented are as found at the time of completing each report and provide the items and figures from which a detailed analysis of water and land use can be made.

The historical data contained in these reports can never become obsolete. If new information is added from time to time as new developments occur, the records can always be kept current and up to date.

HISTORY AND ORGANIZATION

Deer Lodge County was created by the first session of the Montana Territorial Legislative Assembly on February 2, 1865 and comprised an area 70 by 250 miles extending from Canada to the Big Hole River. From it have been carved the present counties of Powell and Silver Bow; greater portions of Glacier, Granite, and Lewis and Clark; and small parts of Pondera, Teton, Flathead, Missoula, Jefferson, and Madison. Through the evolution of counties in Montana, Deer Lodge County has become next to the smallest in the State.

The general topography of Deer Lodge County is mountainous in the extreme, the valleys being little more than depressions between mountain ranges. The average altitude is 6,000 feet, rising to over 10,500 feet on the mountain peaks.

The main range of mountains traversing the county is formed by the Continental Divide and is known locally as the Anaconda Range. Named for the town lying at its eastern base, the range extends westward and southward. The southern base of the range adjoins the broad valley known as the Big Hole Basin which is drained by the Big Hole River, via the Jefferson River, into the Missouri River.

At the western base of the range are the depressions occupied by Georgetown Lake (artificial), and Silver Lake, and a part of Warm Springs Creek Basin opening into the Deer Lodge Valley, which sections have drainage into a tributary of the Clark Fork of the Columbia River.

The county received its name from the Indian name "The White-tail Deer Lodge", because of the resemblance of a certain cone-shaped mound in the upper valley to an Indian Lodge. The mound is about 40 feet high and contains a hot spring. In the winter steam emerges from the top of the mound just like smoke from a lodge. The White-tail deer inhabited this part of the the valley in great numbers, so the white man called the valley, county, river, and a town, "Deer Lodge".

While no definite record can be found to substantiate the fact, it seems likely the first person to range stock in the upper part of the Deer Lodge Valley was Jacques Faquaere, a French squawman and free trader. Faquaere drifted into Montana Territory from California in the fall of 1850, trailing a herd of 50 mixed cattle. The animals were weary and foot-sore, and finding good feed on "The Hump", about fourteen miles west of Butte, he established winter headquarters. Spring found the stock in excellent condition, so Faquaere broke camp and started down stream. By so doing he entered into the upper Deer Lodge Valley, only four miles from where he had spent the winter.

Jacques Faquaere was followed by others during the next decade, but for the greater part these were French-Canadians, who tarried a while and then drifted elsewhere. The majority of those who decided to remain located in the vicinity of what is now the city of Deer Lodge, then known as LaBarge City, and Cottonwood, in the lower end of the valley.

To William Price Thomas, a native of Wales, who migrated to the United States in 1850, goes the distinction of becoming the first permanent settler in the upper, or Warm Springs section of the Deer Lodge Valley.

With his wife and six children, Thomas arrived in the Deer Lodge Valley in April, 1865 and pre-empted a homesite on Warm Springs Creek, about seven miles below the present city of Anaconda. His original stock consisted of 20 head of mixed beef cattle and 30 head of

cayuses. In company with Jim Purdy, with whom he later formed a partnership, the original herd was increased to 500 head of cattle and 250 cayuses. Additional land was added to the homesite, of which 160 acres was devoted exclusively to the growing of hay. Approximately 300 tons of winter feed was cut with scythe each year and stacked by hand.

Thomas never owned a registered brand for his cattle, but the horses were marked JP, the initials of his partner. In later years he milked 14 cows, and soon developed quite a trade at Deer Lodge and Cable for his butter, which brought as high as $2.00 a pound.

The Thomas family had barely located on Warm Springs Creek and were still engaged in putting up buildings, when neighbors arrived. They proved to be William M. James and his family, whose acquaintance the Thomas folks had made in Utah. James was born at Abeville, Wales in 1818, and underwent sufficient hardships to make him a pioneer before he eventually reached Montana. When he pre-empted a tract of ground on Warm Springs Creek in 1865, within a stones-throw of the Thomas homesite, he became the second settler in this part of the valley.

William James died March 6, 1903 at the age of 85 and his memory is revered by all who had occasion to know his friendship. The old original ranch home stood on the site of present day Willow Street in Anaconda. Such industrial plants as the Butte, Anaconda and Pacific Railway shops and the Anaconda Street Railway barns occupy places on the old homestead. Later the family home was moved to the present site of Washoe Park, where it is still used as quarters by the caretaker.

What is now regarded as one of the best income producing tracts of land in the Deer Lodge Valley was homesteaded about 1865 by William McGill. It lies across the road directly east of the main entrance to the State Tuberculosis Hospital grounds at Galen.

McGill eventually sold to Giles Brownell, who immediately replaced the cattle with race horses. Brownell was partial to horses and especially to those capable of showing speed. It was this love for horseflesh that brought him to the attention of Marcus Daly who owned a number of the animals that Brownell kept on the place. Brownell eventually opened a livery stable in Anaconda, but continued to operate the ranch up to the time of his death.

Marcus Daly was not much more than forty years old when he began building the city of Anaconda. In this matter he was governed by the considerations relating to the proper development of the great mining industry in Butte which he had founded and fostered.

In the fall of 1882, there was a current rumor in Butte that the Anaconda Company was about to locate a smelter either at some point on the Big Hole River or on Warm Springs Creek in the Deer Lodge Valley. The report did not create much interest in Butte as it was thought that a little one-horse town would spring up around the smelter, but no one in Butte fully realized the magnitude of the Anaconda Mining Company properties.

Early in the spring of 1883, it became known for a certainty that Mr. Daly had decided upon the Warm Springs site, but there was nothing like a stampede to the area. Nobody regarded it as a significant event in Montana history. There were even those who scoffed at the whole project as visionary and impractical.

Morgan Evans, an early settler and prosperous rancher in the Valley, was commissioned by Mr. Daly to buy the land needed for the smelter and townsite. Daly, in company with Evans,

drove to the site of the future town and camped for a day under the hill by the site of the present Protestant Cemetery. It was a very beautiful valley they gazed upon. The mountains to the south of the city were then thickly studded with fir trees from the foothills to the summit; while Warm Springs Creek, far as the eye could see, was densely lined with cottonwoods of most luxuriant growth. In places, it was next to impossible to get through the rank vegetation to the water.

The site of the city proper was a fine stretch of open prairie. William Reed, later of Columbia Falls, who was the Company's first bookkeeper in Anaconda, said that he well remembers that "while we were surveying, we saw ten White-tail deer scamper across our townsite, making for the little canyon south of us (Sheep Gulch)".

In May, work actually began by the digging of a big ditch to convey water from the creek to the smelter site—the Upper Works. This location was deemed best because of the accessibility of water for drinking, cooking, and laundry purposes. Later on, wells were dug for dwellings and good water was struck at a depth of 25 feet.

Today Anaconda, the county seat, modern and up-to-date in all respects, is the only city in the county. The Anaconda plant, which treats most of the ore from Butte, is the largest copper smelter in the world. The smokestack at the smelter is the highest — 585 feet. A large State Fish Hatchery is maintained at Anaconda from which many streams are stocked annually. Located at Warm Springs is the Montana State Game Farm operated under the auspices of the State Fish and Game Commission. Other institutions in the county are the State Hospital for the Insane at Warm Springs, and the State Tuberculosis Sanitarium at Galen.

In 1950, Deer Lodge County had a population of 16,553 and was ranked eighth among the counties in Montana. In area, the county is next to the smallest in the state covering only 738 square miles. Bordering Deer Lodge County on the north are Granite and Powell counties; on the east Jefferson and Silver Bow counties; on the south Beaverhead County; and on the west Granite County.

TRANSPORTATION

In Deer Lodge County, highway and county road facilities are very good, but railroad transportation is limited to a small area in the eastern party of the county.

Anaconda, the county seat, is served by the Butte, Anaconda and Pacific Railway from Butte. This road transports principally the ores and materials from Butte to Anaconda.

Entering the county near Gregson Hot Springs are the main lines of the Northern Pacific Railway and the Chicago, Milwaukee, St. Paul and Pacific Railroad. These railroads course through the eastern part of the county passing through or near the towns of Warm Springs and Galen and leave the county at Race Track.

The main Federal and State highways are U. S. 10 South and 10 A. and State Highways 48 and 43.

U. S. 10 South enters on the east near Gregson Hot Springs and leaves the county at Race Track. U. S. 10 A crosses from east to west, beginning at U. S. 10 South near Gregson Hot Springs and leaves the county at Georgetown Lake on the west.

State Highway No. 48, a cut-off between Anaconda and Warm Springs, connects U. S. 10 A with U. S. 10 South. State Highway No. 43 follows the county boundary along the Big Hole River, entering from near the mouth of Bear Creek on the east to Pintlar Creek on the west. An improved county road connects State Highway No. 43 at Ralston with U. S. 10 A about three miles east of Anaconda.

In connection with the above railroad and highway facilities, Anaconda is connected to Butte and other major cities by the Intermountain Transportation Company, Greyhound Bus Lines, and various freight truck lines.

The nearest airport facilities are at Butte where connections can be made with Western and Northwest Orient Airlines.

CLIMATE

The Continental Divide crosses Deer Lodge County in an East-West direction just south of Anaconda, and forms the eastern boundary of the county. The headwaters of the Clark Fork of the Columbia River rise on the north slope of the Divide in this general area. The elevation of the greater portion of the county is more than a mile above sea level. As to be expected, temperatures for this high elevation area are cooler than those observed in most sections of Montana. This is reflected in the yearly average temperature of 42.4° at Anaconda and 42.2° at East Anaconda, while the Montana yearly average is 43.2°.

Spring and early summer are cool and cloudy with frequent showers or general rains. June is the wettest month with a precipitation average of more than two inches. February is the driest month with an average of less than three-fourths inch. Precipitation records are not available for the high mountain areas, but like all western mountains winter snowfall accumulations are rather heavy and do not melt until late spring or early summer, providing early growing season irrigation water for lowland areas.

Clear skies and warm days prevail during the late summer and early fall with occasional periods of cloudy showery weather. Because of the high elevation, the diurnal range of temperature is greater than in lower areas, therefore, the days usually are warm and the nights cool. Occasional outbreaks of cold Polar air will bring periods of several days during the winter months when minimum temperatures may be zero or lower, but due to the shielding of the Rocky Mountain Range temperatures are not so severe as on the eastern slopes and on the plains. The storms that accompany these cold outbreaks last about two or three days, and are not usually severe. Thundershowers occur rather frequently during the summer months. Severe storms, such as violent thunderstorms, tornadoes, and damaging windstorms are rare.

The average length of the growing season, the period between the last killing frost or freeze in the spring and the first in the fall is only 98 days at Anaconda, and 117 days at East Anaconda. Frost or freezing temperature has been recorded every month of the year at these two stations, but generally the last frost of the spring is about June 8, and the first in the fall around September 14 at Anaconda, and about May 27 and September 21 at East Anaconda.

A weather record has been kept at the Anaconda Copper Company Smelter since 1905 in East Anaconda, and at Anaconda from 1894 to 1925. A Precipitation-only station was established at Silver Lake in April of 1950, but the Anaconda Company kept records for a number of years prior to the establishment of this station. A tabulation of precipitation and temperature data is listed below for Anaconda and East Anaconda; and precipitation data for Silver Lake.

TEMPERATURE

	Highest of Record	Lowest of Record	January Average	July Average
Anaconda (Elevation 5330)	102	—35	24.2	63.4
East Anaconda (Elevation 5511)	100	—35	21.8	65.9

PRECIPITATION

	Yearly Average	Growing Season Average*	% Growing Season*	Wettest Year	Driest Year
Anaconda	14.24*	9.00	63	18.89 (1908)	9.03 (1902)
East Anaconda	13.45	8.72	65	19.11 (1908)	7.32 (1931)
Silver Lake	21.77	13.27	61	34.86 (1908)	13.35 (1935)

*April through September.

SOILS

Deer Lodge County is in southwestern Montana within the Rocky Mountain Physiographic Province. It is predominantly mountainous, but includes some relatively level lowlands in the Deer Lodge and Big Hole valleys. Also, there is a broad relatively smooth saddle or divide in the vicinity of Georgetown Lake west of Anaconda.

As is typical of areas with widely differing topography, geologic formation, and climate, the soils of Deer Lodge County range widely in natural classification. They include both grassland and forest soils.

The former occur chiefly at the lower elevations in the relatively drier sites, the latter in the mountains where precipitation is higher or evaporation lower so that more moisture enters the soil. In the driest parts of the grasslands the chief soils belong to the Brown great soils group—i. e., they have thin grayish brown surface soils and brown prismatic upper subsoils, and are underlaid by light gray horizons of lime carbonate accumulation beginning at 8 to 12 inches. As effective precipitation increases and the grassy vegetation is more luxuriant the surface and subsoils become darker and thicker, and the great soil group changes to Chestnut (dark brown) and then to Chernozem (black). In forested parts of the county the soils belong chiefly to the Gray Podzolic great soil group—i. e., they have leached, light gray surface soils underlying the litter on the forest floor and, where best developed, darker, and more clayey subsoils.

The agricultural soils of Deer Lodge County are confined chiefly to the terraces in the vicinity of Galen in the north part of the county and to the benches north of the Big Hole River in the southwest part of the county. These two areas differ markedly both as to natural classification and use suitabilities. The cultivated soils in the vicinity of Galen are Brown grassland soils developed in deep, permeable, calcareous fine earths. Burnt Fork silt loam and related soils are the most extensive. They have high natural fertility and with proper management produce well under irrigation. The growing season is sufficiently long to mature potatoes, small grains, and hay.

Soils on the benches north of Big Hole River are chiefly Chernozems (black soils) and dark Chestnuts (dark brown soils). They are developed under grassland vegetation but require a higher effective rainfall for development than the Brown soils. The most extensive well drained soils are loam and cobbly loam types of the Phillipsburg, Quigley, Charlos and Bass series. These are reasonably permeable, deep soils of moderate to high natural fertility. Associated with them are types of the Ravalli series which are claypan soils or "slick spots". In the swales

and along the streams, dark, poorly drained soils high in organic matter, such as the Gallatin series, occur. Since the growing season is too short to mature small grains in all years, the principal land use is hay under irrigation and range under dryland conditions.

Soils in other parts of the county vary widely. On stream bottoms they range from excessively drained and gravelly to poorly drained and high in organic matter; in reaction they vary from very acid to alkaline and saline. These soils are used chiefly for grazing and hay production or are waste land. Soils of the mountainous areas are chiefly kinds which develop under forest vegetation such as Gray Podzolic or Brown Podzolic. Immature profiles predominate. Grassland soils ranging from Chernozems to Browns occur on some of the lower slopes with southeast to southwest exposures. As in the forested areas they are predominantly immature. Parent materials from which the soils have developed include granites, andesites, quartzites, limestones, sandstones, shale and glacial till. The latter is particularly extensive in the valley and highlands west of Anaconda and on the mountainous slopes north of the Big Hole River. Land uses in the mountainous areas include timber production, grazing, and recreation.

CROPS AND LIVESTOCK

Deer Lodge County, one of the smaller counties of the State, has a land area of only 472,320 acres of which 46.1% is in farms. The remainder of the land is largely mountainous, in private and National Forest holdings. Practically all of the private holdings in the mountainous area belong to the Anaconda Copper Mining Company.

There are, according to 1950 census figures, 116 farms in the county, with 68 of these classed as commercial farms. The remaining 48 farms are mostly small acreages whose operators are employed in industry or non-farm occupations and use their farms for supplementing the family living.

Farming in Deer Lodge County is almost entirely dependent upon irrigation, with the production of hay the major crop. Other important crops are small grains and potatoes. Deer Lodge County is one of the largest producers of Certified Netted Gem potato seed in Montana, with nearly 800 acres devoted to this crop. Some dryland wheat is grown, although the greatest acreage of spring grains are grown under irrigation.

Most of the hay and grain grown is used locally to feed livestock. There is very little surplus of either commodity.

One large corporation farm, The Mount Haggin Land and Livestock Corporation, owns approximately 90% of the agricultural land in the county which is used to maintain its sheep operations and is in part leased to individual operators.

Deer Lodge County is predominantly a range livestock county and the home of one of the most famous purebred sheep ranches in the State, The Mount Haggin Land and Livestock Company, producers of Hampshire and Columbia sheep. The county lies across the Continental Divide along the south boundary taking in a small triangular section of the famous Big Hole Valley. The major portion of the 5,100 head of cattle shown on the Assessor's records are raised in this portion of the County. The county records also show 6,800 head of ewes listed which are practically all under one ownership.

A few small dairies help provide milk for the city of Anaconda and Butte, although all of this section is a dairy import area.

While the number of livestock is small, the quality is generally excellent. The size of the County, its mountainous topography, and the large amount of land which is utilized for industrial purposes limits the Agricultural potential of the County.

WATER SUPPLY

The Continental Divide separates the drainage of Deer Lodge County into two major river basins: the Columbia, and the Missouri. This area, being a part of the headwaters of the Big Hole River and the Clark Fork of the Columbia, consists of small individual irrigation systems rather than large incorporated or mutual use projects.

The Missouri River Basin

The east slope of the Continental Divide within Deer Lodge County drains into the Big Hole River, which flows into the Jefferson River, and finally into the Missouri River. The Big Hole River has its headwaters in the drainage area of the Beaverhead Range of Mountains along the western border of Beaverhead County. This river flows out of Beaverhead County forming the southern boundary of Deer Lodge County. Tributaries of the Big Hole River in Deer Lodge County flow in a southerly direction and the streams of principal irrigation importance are Pintlar Creek, Mudd Creek, Fishtrap Creek, LaMarche Creek, Seymour Creek, Deep Creek, and Bear Creek.

The Columbia River Basin

That portion of Montana west of the Continental Divide drains into the Columbia River Basin through the Clark Fork and the Kootenai Rivers. The Clark Fork was named for Capt. William Clark of the famed Lewis and Clark expedition. Originally, the name "Clark Fork" probably applied to the river from its headwaters to its confluence with the Columbia River north of the International Boundary in British Columbia. However, the Clark Fork of the Columbia since that time has been given other names in different localities along its length by the people as the country was settled, and water filings have been made using these local names. In order that these filings correspond to the different named segments of the river, it was known as follows: Headwater streams were considered to be Silver Bow Creek and German Gulch Creek, which combine near the railroad station of Durant in the western part of Silver Bow County, to form the Deer Lodge River. This designation existed to the confluence of the Little Blackfoot River with the Deer Lodge River near the town of Garrison in Powell County. Below this point and to the confluence with the Blackfoot River near the town of Bonner in Missoula County, it was known as the Hellgate River. From this point to the junction with the Flathead River near the town of Paradise in Sanders County, the stream was called the Missoula River. Between the mouth of Flathead River and Lake Pend Oreille in Idaho it took the name Clark Fork River, and from Pend Oreille Lake to the Columbia River it was known as the Pend Oreille River.

Tributary streams in the Columbia River Basin, in Deer Lodge County, of importance to irrigation are: Willow Creek, Mill Creek, Warm Springs Creek, Lost Creek, and Race Track Creek.

STREAM GAGING STATIONS

The United States Geological Survey carries on the work of measuring stream flows in cooperation with funds supplied by the State and several Federal agencies. The results are tabulated in book form, the last publication being in 1949. The water year, as published in the books, begins October 1 and ends September 30 of the following year.

Following are equivalents useful in converting from one unit of measurement to another:

(a) In Montana, one cubic foot per second equals 40 miner's inches.

(b) One acre foot is the amount of water required to cover an acre one foot deep.

(c) One cubic foot per second will nearly equal two acre feet (1.983) in 24 hours.

(d) A flow of 100 miner's inches will equal five acre feet in 24 hours.

(e) One miner's inch flowing continuously for 30 days will cover one acre 1½ feet deep.

Georgetown Lake

Georgetown Lake is an artificial reservoir. Storage began in 1905 for pumpage into Warm Springs Creek for use at the smelter in Anaconda, or for release for generating power on Flint Creek. The usable capacity from Georgetown Lake is 31,000 acre feet.

Flint Creek

A gaging station is located on Flint Creek ½ mile below the power plant at Georgetown Lake, or 3 miles northwest of Southern Cross. Records are available from October 1, 1940 to September 30, 1954. The drainage area above the gage, part of which is in Deer Lodge County, is 52.6 square miles. The flow is regulated by storage in Georgetown Lake. The average discharge from the 14 years of record is 33.4 cfs. The maximum discharge over the period of record was 174 cfs (June 13, 1942). The minimum flows were probably, August 20, 1943 and May 23, 1952 when the generator was shut down. At times the flow may be augmented by transbasin diversions by pumping water from Silver Lake to Georgetown Lake or vice versa.

Race Track Creek

The gaging station was located three miles above Race Track ranger station, ten miles north of Anaconda, or 9½ miles above the mouth of the creek. Records are available from July 11, 1911 to November 9, 1912. The drainage area above the gage is 39½ square miles. Numerous diversions for mining were above the gage. During the short period of measurement, the maximum flow was 515 cfs (June 10-14, 1912) and the minimum flow was 16 cfs at various times during February and March, 1912. The maximum flow in acre feet was 22,100 in June, 1912. The records are of too short a duration and too intermittent from which annual flows can be deducted.

Big Hole River

A gaging station is located at the bridge on U. S. Highway 91, an eighth of a mile from Rock Creek, or 8 miles south of Melrose. Records are available at this station from March 15, 1924 to September 30, 1954, but the records are fragmentary from 1924 to 1932. The drainage area above the gage is 2470 square miles. The maximum discharge observed over the 22 years of record was 23,000 cfs (June 14, 1927) when Wise River Reservoir Dam failed. The maximum discharge unaffected by the dam failure was 14,100 cfs (June 3, 1948) and the minimum was 49 cfs (August 17, 1931). The average discharge for the 22 years of record is 1,124 cfs. There are many diversions above the gage for irrigation of about 136,000 acres of land in the Big Hole Basin.

MINING

Deer Lodge County is important to the mineral industry not so much for its mining as for its metallurgical industry. At Anaconda, the county seat, is one of the world's largest smelting plants, owned and operated by the Anaconda Copper Mining Company. The smelter treats the copper, lead, zinc, silver, and manganese ores principally from the Butte district. The final products of the plant are copper anodes (sent to Great Falls for final refining), slab zinc, ferro-

manganese and manganese oxide sinter, phosphate fertilizer, sulphuric acid, and white arsenic. By-product metals such as gold, silver, platinum, cadmium, germanium, etc., are recovered from refinery sludges in plants outside of Deer Lodge County.

The mines of the county were valued more for their precious metal output (gold and silver) than for their production of base metals such as copper, lead, and zinc. Since 1904, (when detailed statistics compiled by the U. S. Geological Survey and the U. S. Bureau of Mines first became available) to the end of 1953, the county has produced gold, silver, copper, lead, and zinc valued at $8,248,857. Of this total, gold has accounted for 84 per cent, silver for 12 per cent. copper for 3 per cent, and lead and zinc for the remaining 1 per cent. For the 39 years prior to the application of War Production Board Order L-208 on October 8, 1942, restricting gold mining, the county produced about $208,000 in metals per year. Since that time yearly production has averaged only $8,200 in value, with a maximum production valued at $29,230 in 1950. This drastic curtailment in production is due simply to the inability of gold mining to stage a comeback in the face of rising costs since the suspension of Order L-208.

In the last year or so, mining interests have turned their attention to tungsten ores of the county. By the help of modern prospecting methods utilizing "black" or ultraviolet light, notable deposits of scheelite (the fluorescent calcium tungstate) have been found. Deposits of apparent commercial significance occur in the Storm Lake area, north and south of Silver Lake, and north of Anaconda in the Olson Mountain area. The county may well again become an important mining region, with strategic tungsten the valuable mineral.

The county also produces limestone for smelter flux and sand and gravel for the construction industry.

Blue Eyed Nellie (Silver Lake)

The Blue Eyed Nellie district is in the vicinity of Browns siding, 6 miles west of Anaconda. Small mines and prospects showing metalliferous ores occur over a large area, but they are not closely spaced. Silver is the principal metal. The Blue Eyed Nellie, credited with a production of several hundred thousand dollars, was the most important mine.

On the slope to the northeast of Warm Springs Creek, the prevailing rocks are sedimentary—mostly Poleozoic limestone, complexly faulted and in places closely folded. They are intruded by granitic and basic igneous rocks which locally have caused considerable contact metamorphism. Nearly all the ore deposits are argentiferous replacement deposits in calcareous rocks. Some are thinly tabular bodies following bedding planes but most appear to be chimneys or pockets of very irregular shape. The Morgan Evans veins are a fissure filling in basic diorite. The Black Chief magnetite deposit is of contact origin.

A list of the mines includes the following: Blue Eyed Nellie, Mayflower, Greyrock, Black Chief, Cameron, Antelope and Chain ($60,000), Morgan Evans, George, Jetty, New Year (Emma), Welcome, Silver King, Silver Queen, Carp, Okoreaka, Silver Hill, and Silver.

French Gulch

French Gulch Creek is a south flowing tributary entering the Big Hole River about 20 miles northwest of Divide, a station on the Oregon Short Line Railroad. The district is about 12 miles south of Anaconda and lies on the south flank of the Anaconda range, over the divide from the German Gulch district. Placer gold was discovered here in the early 60's, and by 1870 the district is said to have yielded over $1,000,000 in placer gold. Production since that time has been intermittent, the last recorded activity being in 1949 when $2,564 in gold was produced.

No lode deposits of consequence have as yet been discovered in this area, and it is thought by some that the region is worthy of careful prospecting with a view towards locating the source of the placer gold. However, it is very likely that the gold in the placers was derived from low grade deposits similar to and possibly extensions of those in German Gulch to the northeast.

Georgetown—Southern Cross—Cable

These districts are in the northwest corner of Deer Lodge County, about 15 miles west of Anaconda, and include the area north of Silver Lake and west of Warm Springs Creek. The total production including the Red Lion district to the north, up to 1907, is given at about $5,000,000. This is the most important gold mining area in Deer Lodge County and was still active in 1951.

The country is in an area of faulted and folded sedimentary rocks, mainly of Paleozoic age, cut by intrusive granite and related rocks. The granite occupies an area of several square miles, just east of Georgetown. Its boundaries are rudely circular, but small apophyses and dike-like masses occur in the surrounding sediments. The most important mines are in the sedimentary rocks near the granite contacts, and others occur entirely within the granite area. Named in order of their importance the deposits have been divided as follows: 1. gold-copper replacements of contact origin; 2. gold-bearing replacement veins in sedimentary rocks; 3. gold-bearing veins in granite; 4. silver-bearing replacement deposits in calcareous rocks; and 5. contact deposits of magnetic iron ore. Gold also occurs in placers some of which were very profitable. The important properties are: Cable, Southern Cross, Gold Coin, Twilight, Montana, Orphan Boy, Almaden, War Eagle, Reliance, Golden Gate, Pyrenees, Luxemborg, Silver Reef, and Ontario.

The Cable placer was a bonanza. The gravels of Cable flats are gold-bearing but are too deep for most modern types of dredges.

Heber (Mill Creek)

The Heber district is on Mill Creek a few miles south of Anaconda. The area has not been important as a producer of metallic ores. The latest recorded production was $848 in gold in 1941. The ores from the Spain mine carried gold, silver, and a little copper. The district has also produced some lead ore.

The rocks at the head of Mill Creek belong to the Belt series. Locally they are covered by volcanics thought to be of Cretaceous age. The lower part of Mill Creek flows through an area underlain by a large granitic stock.

Oro Fino (Dry Cottonwood)

This district is on the western slope of the Continental Divide about 8 miles east of Racetrack, a station on the Northern Pacific, and Chicago, Milwaukee, and St. Paul Railroads. Several placer and lode deposits have been worked here within the last 50 years. Total production through 1948 is estimated at about $400,000, mostly in silver from the Champion mine. Caribou, Oro Fino, and Dry Cottonwood placers were worked in the early 60's. Dry Cottonwood, dredged in 1910, also yielded sapphires. The Champion was first operated in 1886-88 and again from 1920 to 1926. The district was last active in 1948.

The country rock of the region is Butte 'granite', and the ore deposits occur in veins. Outcrops are generally concealed. The Champion ore consisted of quartz with a small amount of sulphides including ruby silver. On the Last Resort, the ore was early limonite stained with copper carbonate and carrying residual pyrite and galena. Ore from the St. Louis yielded

gold, silver, copper, and lead. The Jackpot ore carries copper with some molybdenite. Ore from a recently opened deposit consists of quartz with some sulphides, chief of which is ruby silver. The mines are: Champion, John, Independence, and Cashier.

Lost Creek—Dry Gulch—Antelope Creek

This district is in the foothills a few miles north of Anaconda. Placer gold has been produced from Modesty, Lost, and Antelope Creeks and their tributaries in the early days and since 1920, small amounts of placer gold have been produced yearly from Dry Gulch. Production, however, has not been very important. In 1931, a test shipment of gold ore was made from the Dark Horse mine. No lode mines were active in 1954. The last reported production was $175 in placer gold in 1946.

The district lies along the east slope of Flint Creek (Philipsburg) Range. The creek valleys have been formed in glacial gravel.

SOIL CONSERVATION DISTRICTS

A Soil Conservation District is a legal subdivision of the State, established by the farm and ranch owners and operators, which permits group action in dealing with the problems in soil erosion, moisture conservation, soil fertility, and land use.

The Montana State Soil Conservation District Law was passed by the 26th General Assembly on February 28, 1939, and gives the authority for organizing Soil Conservation Districts within the State. Under provisions of the Law, no district can be formed unless the people want it, nor unless they register this want; first by petition, and later by a favorable vote of at least 65 per cent of the qualified voters in the proposed district. The law also provides for the formation of a State Soil Conservation Committee, which assists in the organization of districts and also in securing cooperation from State and Federal agencies.

The main governing body of a Soil Conservation District is the board of five supervisors who are elected by the people of the District. This board is empowered by the law to study the conservation problems of the district and to formulate programs to deal with these problems. This board may call upon local, state, and federal agencies to assist in executing the district's program, and, by applying to the Board of Supervisors, farmers and ranchers may obtain such technical assistance as the District may have without expense to the operator. The use of other facilities, such as earth-moving equipment, owned, leased or contracted for by the Districts are made available at rates fixed by the Board of Supervisors.

In the State at the present time there are 59 Soil Conservation Districts organized, and 22 Cooperative State Grazing Districts receiving technical assistance from the Soil Conservation Service in conducting conservation programs.

Two Soil Conservation Districts have been organized in Deer Lodge County. The portion of the county lying north of the line between townships 4 and 5 north is included in the Deer Lodge Valley Soil Conservation District with headquarters in the town of Deer Lodge, while the balance of the county is contained in the Mile High Soil Conservation District, headquartered in Butte. Approximately 165,053 acres of Deer Lodge County is in the Deer Lodge Valley Soil Conservation District. The districts were organized in 1949 and 1951 respectively. The majority of the farming area of Deer Lodge County is within the Deer Lodge Valley Soil Conservation District including the area along Warm Springs Creek west of Anaconda and the bench land along Race Track, Modesty, and Lost Creeks together with the lands along the

Clark Fork River. In the southern portion of the county, farming is confined to small but numerous and rather isolated pockets of fertile land along the many small creek courses.

The governing body of the districts have signed memorandums of understanding with the U. S. Soil Conservation Service and the State Extension Service to provide technical and educational assistance. They have developed district programs and work plans describing their own problems and the way they intend to meet them. Although the problems in these districts vary, their annual plans have stressed guidance in proper land use and the development of sound conservation measures on these lands. The majority of the work completed to date consists of land leveling, drainage, improved irrigation canals, and improved methods of distributing irrigation water on the fields. The district stresses improved pastures and management of ranges along with crop rotation, weed control, and range re-seeding. A few irrigation storage dams have been built and others are planned for future developments. Several large irrigation canals were completely rehabilitated in the Divide and Melrose areas.

The Soil Conservation District Supervisors, assisted by the local County Agent, have teamed up with the 4-H leaders in sponsoring annual conservation day programs. The Districts are also assisting the local FFA chapter in soils, range, and pasture management practices. In general the improvement and development of land and the conservation of the natural resources has been greatly stimulated by the work of these districts and the cooperating agencies. The conservation program in this county is gaining momentum and people are beginning to realize the urgent need for community action to conserve water, soil, and vegetation for future generations.

ANACONDA STATE FISH HATCHERY

In 1907, Mr. E. P. Mathewson, President of the Montana Fish and Game Commission and General Manager of the Anaconda Smelter, was instrumental in securing a site for construction of the Anaconda State Fish Hatchery.

On November 14, 1908, John Ryan, President of the Butte, Anaconda and Pacific Railroad, granted to the state a small tract of land of approximately four acres, together with all buildings and improvements that had been constructed on the tract. Contained in the grant was a right of way for a flume to carry water from the Anaconda Copper Mining Company flume to the hatchery site. In addition to the land and appurtenances, a water right was acquired to all the water of certain springs located in the NE¼ of Section 4, Township 4 North, Range 11 West, appropriated by Alexander Glover in 1879. Probably the most important water right is from Warm Springs Creek, Case No. 2495, which gives the use of 90 miner's inches with no priority date. This water from Warm Springs Creek is diverted by means of a ditch to Heffner's Dam, thence by flume to the hatchery.

The first supervisor of the hatchery was Mr. C. F. Healea, but little is known of the hatchery production for the first four years. Records are available, however, that show Grayling were transplanted into Georgetown Lake in 1909. In 1912, 900,000 Eastern Brook trout were hatched and distributed and egg collection stations were started at Georgetown Lake. During this year, through the efforts of Senator Myres, 2,500,00 eggs were obtained from the United States Bureau of Fisheries. This acquisition made enlargement of the hatchery necessary, and twenty troughs were added along with a Grayling battery capable of incubating 10 million eggs. During the 1930's, through W. P. A. funds additional expansion was accomplished. In 1940 a new residence was built and in 1948 new raceways and ponds were constructed to raise larger fish. The hatchery has continued to grow the last four years, with new buildings constructed, and improvements made on all facilities.

The area for distribution for the Anaconda State Fish Hatchery is headwaters of the Clark Fork of the Columbia River drainage to Missoula and the headwaters of the Big Hole River above Dillon.

Recently a development program was initiated to increase the planting of trout in lakes and to stock streams with fish of a legal size.

DEER LODGE NATIONAL FOREST

Anaconda District

Deer Lodge County includes virtually all of the Anaconda Ranger District and part of the Deer Lodge Ranger District of the Deer Lodge National Forest. In addition, it includes small parts of the Wisdom and Wise River Districts of the Beaverhead National Forest in the Big Hole River drainage.

The boundaries of Deer Lodge County lie on both sides of the Continental Divide, with almost equal parts of its area drained by the Big Hole River and Clark Fork of the Columbia River. Water that drains into the Big Hole River is used extensively for irrigation in the Big Hole Valley and for the city water supply of Butte. The important drainages that flow into the Big Hole River from Deer Lodge County are Pintlar, Mudd, Fishtrap, LaMarche, Seymour and Deep Creeks.

The important drainages that flow eastward into the Clark Fork of the Columbia River are Willow, Mill, Warm Springs, and Lost creeks. The North Fork of Flint Creek, partly located in Deer Lodge County, is also a tributary of the Clark Fork of the Columbia by way of Georgetown Lake and Flint Creek. There are a few other minor drainages in the county, but they are of value only for limited irrigation in their own localities.

Warm Springs Creek with its tributaries is the most important drainage in the county from an economic standpoint. This drainage is the principal water supply for the Anaconda Copper Mining Company's smelter. It is also the city water supply for Anaconda and is used for irrigation on ranches, both above and below Anaconda. Much development work has been done on this drainage, its tributaries, and the supplemental lakes, to insure a stable water supply for the smelter. Deep wells in the vicinity of Heffner's Dam are also a part of this development.

Silver Lake, with an area of about 320 acres, located approximately 15 miles west of Anaconda is used as a reservoir for water flumed into it from Georgetown Lake. Water is pumped from this reservoir into lower Storm Lake Creek, which flows into Cable Creek and which in turn flows into Warm Springs Creek.

Georgetown Lake, about half of which is in Deer Lodge County, is an artificial lake approximately 3000 acres in area on the North Fork of Flint Creek. It is primarily a storage reservoir for the smelter; secondly, it furnishes water for the Flint Creek power station and for irrigation in Flint Creek Valley. This lake is extremely important for its recreational value and is one of the most noted fishing lakes in Montana.

Water from the wild lands on the National Forest in Deer Lodge County is the outstanding natural resource of the area, followed by wildlife, recreational opportunities, timber, and range for domestic livestock. The condition of the watersheds in the area is of prime importance both to local residents and to the people on the drainages below. The Forest Service through its administration continually strives to maintain and increase the water holding capacity of the

land. This is true not only through fire control, but by control of range use, logging, wildlife, and all other uses of the land. Forest fires destroy timber, forage, game habitat, and recreational facilities, but the principal long range effect of fires is the destruction of the water holding capacities of the forest land.

The history of land use in the Anaconda area is one of land abuse. In 1878, the original copper smelter was located in Anaconda. From that time until about 1900 fumes from the smelter killed the timber over a large area in the vicinity of Anaconda. Also, until 1916, wood was used for heating in the smelter and an enormous quantity of timber was cut for that purpose. As a consequence, an area varying from 10 to 15 miles in radius from Anaconda was virtually denuded. Further, slash fires usually followed logging so that the land was stripped of vegetation. Weeds and grasses normally came in to cover the soil where they could establish themselves. These areas were again often exploited by overgrazing by domestic livestock. Even today overgrazing is occurring in several areas. However, most of the land is now covered with vegetation and is being stabilized.

The land ownership pattern in Deer Lodge County is complicated, because of the intermingling of Anaconda Copper Mining Company and other private lands with National Forest land. The Forest Service furnishes fire protection for the Anaconda Copper Mining Company lands in the county.

The timbered areas in Deer Lodge County are largely on National Forest and Anaconda Copper Mining Company lands. The principal tree species are Lodgepole Pine and Douglas Fir. Other species of trees are Engleman Spruce, Whitebark Pine, Alpine Larch, Juniper, and Aspen.

Wildlife population are generally on the increase. This is particularly true of deer and elk. Game estimates for 1953 in Deer Lodge County are as follows: Deer, 865; Elk, 525; Mountain Goat, 150; Moose, 37. Game population on a given area must be kept under control to prevent over-population and over-use of the range.

The best method to control game population is through hunting. Hunting seasons are set by the State Fish and Game Commission, but there is close cooperation between the State, sportsmen's associations, and the federal agencies in game management. The money spent for hunting and the meat taken by hunters is of real economic benefit to the people of Deer Lodge County.

Grazing of livestock is of lesser importance than most of the other economic uses of wild land. However, approximately 1000 cattle and 5000 sheep are grazed in the county.

The development and maintenance of suitable recreational facilities on the National Forests is an important activity. The Forest Service maintains nine improved camp and picnic grounds for public use. Two others are maintained by civic organizations. In addition, there are 157 summer homes under special use permit on National Forest land and Anaconda Copper Mining Company land. Other special uses permitted on National Forest lands are for power lines, roads, water transmission projects, pastures, and boating facilities.

The aim of the Forest Service is to maintain and increase the benefits derived from wild lands. This is accomplished primarily through supervision of grazing and logging and by fire and erosion control. These activities protect the forests, wildlife habitat, livestock, recreational areas, and the water holding capacity of the forest land. The overall policy of the Forest Service is to provide for integrated use of all resources on a sustained yield basis.

SUMMARY OF IRRIGATED LAND BY RIVER BASINS IN THE FOLLOWING COUNTIES COMPLETED TO DATE

Big Horn, Carbon, Custer, Deer Lodge, Gallatin, Golden Valley, Madison, Meagher, Musselshell, Park, Rosebud, Silver Bow, Stillwater, Sweet Grass, Treasure, Wheatland, and Yellowstone

RIVER BASIN	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River Drainage Basin			
***Missouri River**	4,126	1,512	5,638
Jefferson River	34,735	6,388	41,123
Beaverhead River	7,367	1,815	9,182
Ruby River	33,404	4,261	37,665
Big Hole River	23,775	1,950	25,725
Madison River	39,445	7,660	47,105
Gallatin River	111,914	21,097	133,011
Smith River	30,304	18,398	48,702
Musselshell River	64,789	57,870	122,659
Grand Total Missouri River Basin	**349,859**	**120,951**	**470,810**
Yellowstone River Drainage Basin			
Yellowstone River	299,053	96,088	395,141
Stillwater River	27,489	16,403	43,892
Clarks Fork River	91,768	24,195	115,963
Big Horn River	65,395	25,579	90,974
Tongue River	22,137	7,479	29,616
Powder River	8,264	1,804	10,068
Grand Total Yellowstone River Basin	**514,106**	**171,548**	**685,654**
Columbia River Drainage Basin			
Clark Fork (Deer Lodge, Hellgate) River	15,636	1,438	17,074
Grand Total Columbia River Basin	**15,636**	**1,438**	**17,074**
Grand Total in the Counties Completed to Date	**879,601**	**293,937**	**1,173,538**

Names of streams indented on the lefthand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF DEER LODGE COUNTY BY RIVER BASINS

REGULAR IRRIGATION—Missouri River Basin	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
***Missouri River**	0	0	0
Jefferson River	0	0	0
Big Hole River	39	0	39
Pintlar Creek	1,780	235	2,015
Swamp & Springs	154	0	154
Seven Springs	98	0	98
York (Gulch) Creek	444	0	444
Unnamed Spring	39	0	39
Mudd (Williams) (Harris) Creek	752	366	1,118
Calvert Creek	85	0	85
Fishtrap Creek	2,881	0	2,881
Trout Creek	21	0	21
East Branch	187	0	187
Swamp Creek	104	0	104
La Marche Creek	776	22	798
Seymour Creek	354	0	354
Deep (Big) Creek	31	103	134
Seven Mile (Nine Mile) Creek	0	65	65
Ten Mile Creek	0	215	215
Slaughterhouse Creek	0	20	20
Corral Creek	0	80	80
Twelve Mile Creek	0	190	190
Sullivan Creek	175	195	370
French Gulch Creek	242	0	242
American (Gulch) Creek	70	0	70
Little America Creek	0	24	24
Six Mile (Keep Cool) Creek	20	0	20
Connors Creek	5	0	5
Bear (Golden) Creek	212	0	212
Grand Total Regular Irrigation—Missouri River Basin	**8,469**	**1,515**	**9,984**

*Names of streams indented on the lefthand margin indicate that they are tributaries of the first stream named above which is not indented.

IRRIGATION SUMMARY OF DEER LODGE COUNTY BY RIVER BASINS

FLOOD IRRIGATION—Missouri River Basin	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Missouri River	0	0	0
Jefferson River	0	0	0
Big Hole River	0	0	0
Slough	36	0	36
Calvert Creek	106	0	106
Grand Total Flood Irrigation—Missouri River Basin	**142**	**0**	**142**
REGULAR IRRIGATION—Columbia River Basin			
Deer Lodge River (Clark Fork of the Columbia River)	333	45	378
German (Gulch) Creek	133	216	349
Willow Creek	944	118	1,062
Seepage	43	0	43
Mill Creek	1,741	0	1,741
Two (2) Wells	35	37	72
Warm Springs Creek	1,960	72	2,032
Cable Creek	0	29	29
Twin Lakes Creek	15	2	17
Foster Creek	0	13	13
Springs	42	0	42
Springs, Ponds, Lakes	287	3	290
Dutchman Creek	544	70	614
Lost Creek	2,881	33	2,914
Springs	12	0	12
Antelope Creek	132	0	132
Springs	3	0	3
Dry Cottonwood Creek	32	8	40
Modesty (Gulch) Creek	792	111	903
Springs	170	20	190
Little Modesty Creek	185	0	185
Racetrack Creek	2,449	125	2,574
Pond	85	0	85
Hell Gate River (Clark Fork of the Columbia River)	0	0	0
Flint Creek	0	0	0
North Fork	0	0	0
Echo Lake Creek	14	0	14
Grand Total Regular Irrigation —Columbia River Basin	**12,832**	**902**	**13,734**

IRRIGATION SUMMARY OF DEER LODGE COUNTY BY RIVER BASINS

FLOOD IRRIGATION—Columbia River Basin	Present Irrigated Acres	Irrigable Acres Under Present Facilities	Maximum Irrigable Acres
Deer Lodge River (Clark Fork of the Columbia River)	0	0	0
Gregson Spring Creek	61	0	61
Mill Creek	0	32	32
Whitcraft (Gulch) Creek	16	0	16
Warm Springs Creek	0	0	0
Stumptown (Stump City) Spring	9	20	29
Stuckey (Gulch) Creek	0	0	0
Springs	26	0	26
Nates (Icehouse Gulch) Creek	35	0	35
Spring	3	0	3
Glovers (Gulch) Creek (Sailes Gulch) Creek	2	3	5
Perkins (Gulch) Creek	17	0	17
Lost Creek	10	0	10
Springs	74	0	74
Coal (Gulch) Creek	0	0	0
Coal Gulch Spring	6	0	6
Antelope Creek	2	7	9
Dry Cottonwood Creek	15	65	80
South Fork	7	0	7
Unnamed Creek	4	0	4
Modesty (Gulch) Creek	8	0	8
Unnamed Branch	70	0	70
Little Modesty Creek	0	14	14
Racetrack Creek	0	35	35
Hell Gate River (Clark Fork of the Columbia River)	0	0	0
Flint Creek	0	0	0
North Fork	10	0	10
Grand Total Flood Irrigation—Columbia River Basin	**375**	**176**	**551**
Grand Total of Regular and Flood Irrigation (Missouri River Basin) in Deer Lodge County	**8,611**	**1,515**	**10,126**
Grand Total of Regular and Flood Irrigation (Columbia River Basin) in Deer Lodge County	**13,207**	**1,078**	**14,285**
Grand Total All Irrigation in Deer Lodge County	**21,818**	**2,593**	**24,411**

MILL CREEK IRRIGATION COMPANY

HISTORY

First use of the Mill Creek Ditch was by the Deer Lodge Valley Farms, a subsidiary of the A. C. M. On May 9, 1914, the Mill Creek Irrigation Company was formed to supply water to users in the area known as the Opportunity Tracts. After expiration of the corporate articles, May 9, 1934, the company filed an extension of existence for a period of 40 years, the expiration date being May 9, 1974.

PRESENT STATISTICS

Location: The ditch takes out of Mill Creek in the SENE, Section 24, Township 4 North, Range 11 West; a rock filled dam diverts water into the ditch. Following a Northeasterly direction the ditch passes through Section 24, Township 4 North, Range 11 West, and Sections 19, 18, 17, and 16, Township 4 North, Range 10 West to a point where it empties into Brundy Creek, an old channel of Mill Creek, thence into Opportunity where it is distributed through the various laterals. Land irrigated is in Sections 9, 10, 11, 14, 15, 16, Township 4 North, Range 10 West.

Length and Capacity of Canal: The main ditch from Mill Creek to Brundy Creek is approximately 3¼ miles long. Laterals extend another 10.4 miles or a total overall length of 13.65 miles. Three laterals are directly from Mill Creek, six laterals from Brundy Creek, two other laterals pick up water from Springs on the south side of Opportunity in Section 15.

Capacity of the ditch is sufficient to carry 500 miner's inches.

Operation and Maintenance: Assessments for operation and maintenance were originally set up at $1.00 per acre, the last assessment being made in 1933. Since that date the users have voluntarily contributed labor and materials toward the upkeep of the project.

Present Users: A non-profit organization having capital stock of $50,000.00 is divided into 5000 shares of a par value of $10.00 each. Present shares of stock subscribed amount to 633½ shares divided among 111 users of active stock, and approximately 5 shareholders holding 369 shares of non-active stock.

Acreage Irrigated: In 1955, there were 479 acres irrigated under the Mill Creek Irrigation Company Ditch with no potentially irrigable land under the system.

WATER RIGHT DATA

Only one water right is designated for Mill Creek Irrigation Company, and was decreed to Henry Brundy, in the amount of 500 miner's inches, with the priority date of 5-1-65 from Mill Creek. (Ref: Case No. 5060, recorded in Judgement Book J—Page 72, Clerk of District Court Office, Deer Lodge County, Anaconda, Montana.)

Some water shortage does occur under this system because of inadequate laterals and the neglect of individual maintenance.

WATER RIGHT DATA — DEER LODGE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

Stream	Appropriations (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Decreed Rights Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
MISSOURI RIVER BASIN							
Missouri River	0	0	0				
Jefferson River	0	0	0				
Big Hole River	1	1,000	25,000				
Pintlar Creek	11	5,185	129.625				
Seven Springs	1	300	7.500				
York (Gulch) Creek	2	320	8.000				
Dry (Gulch) Creek	1	140	3.500				
Mudd (Williams, Harris) Creek	19	13,820	345.500				
Springs and Seepage	1	300	7.500				
Toomey Spring	1	150	3.750				
Lockwood Creek	1	200	5.000				
Calvert Creek	1	800	20.000				
Fishtrap Creek	21	14,120	353.000				
Trout Creek	2	1,100	27.500				
North Fork	(See Fishtrap Creek)						
South Fork	(See Fishtrap Creek)						
East Branch	1	300	7.500				
West Fork	4	3,680	7.500				
Swamp Creek	1	100	2.500				
Waste	1	320	8.000				
La Marche Creek	8	15,460	386.500				
Brant (Gulch) Creek	(See La Marche Creek)						
Second Right Hand Fork	(See La Marche Creek)						
Mud Lake	1	160	4.000				
Middle Fork	1	600	15.000				
East Fork	6	2,330	58.250				
Willow Creek	1	400	10.000				
Seymour Creek	13	9,520	238.000				
Deep (Big) Creek	15	13,110	327.750				
East Branch	(See Big (Deep) Creek)						
Left Hand Fork	(See Big (Deep) Creek)						
Middle Fork	(See Big (Deep) Creek)						
Right Hand Fork	(See Big (Deep) Creek)						
Unnamed Creek	(See Big (Deep) Creek)						
West Branch	(See Big (Deep) Creek)						
Seven Mile (Nine Mile) Creek	4	2,750	68.750				
Ten Mile Creek	3	3,944	98,600				
Slaughterhouse Creek	1	3,944	98.600				

WATER RIGHT DATA — DEER LODGE COUNTY

APPROPRIATIONS AND DECREES BY STREAMS

Stream	Appropriations (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Decreed Rights Case No.	No. of Inches	Miner's Inches	Cu. Ft. Per Sec.
Timothy Creek	2	700	17.500				
Corral Creek	1	200	5.000				
East Branch	1	100	2.500				
Unnamed Creek	1	300	7.500				
White Creek	1	500	12.500				
Twelve Mile Creek	2	1,200	30.000				
West Branch	1	300	7.500				
Sullivan Creek	9	4,180	104.500				
Tessier Creek	1	———	———				
French Gulch Creek	4	700	17.500				
California Creek	9	2,550	63.750				
North East Fork	1	150	3.750				
North & Middle Forks	1	80	2.000				
Unnamed Spring	1	160	4.000				
Oregon Gulch	1	———	———				
American (Gulch) Creek	7	720	18.000				
Six Mile (Keep Cool) Creek	7	3,925	98.125				
Julius Creek	1	120	3.000				
First Chance (Gulch) Creek	4	1,100	27.500				
Moose Creek	9	1,840	46.000				
Lincoln Creek	2	800	20.000				
Connors Creek	1	60	1.500				
Bear (Golden) Creek	8	5,000	125.000				
TOTAL	**197**	**115,194**	**2879.850**				

WATER RIGHT DATA — DEER LODGE COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

Streams	Appropriations (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Decreed Rights Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
COLUMBIA RIVER BASIN							
Deer Lodge River (Clark Fork of Columbia River)	12	9,750	243.750	143	21	1,860	46.500
German (Gulch) Creek	3	2,020	50.500				
Silver Bow Creek	2	700	17.500				
White Pine Creek	1	200	5.000				
Gregson Spring Creek	1	100	2.500				
Gregson Hot Springs	1	200	5.000				
Johnson (Tremblay, Nordegian) Creek	1	100	2.500				
Flint Creek	0	0	0				
Hensley (Gulch) Creek	1	20	.500				
Bernard (Gulch) Creek	1	100	2.500				
Willow Creek	13	6,700	167.500				
First Right Hand Branch	(See Mill Creek)						
Morses Fork	(See Mill Creek)						
Rouse Creek	1	50	1.250				
Unnamed Springs	2	20	.500				
Mill Creek	28	30,098	752.450	5060	28	9,149	228.725
Middle Fork	(See Willow Creek)						
South Fork	(See Willow Creek)						
Birmingham Creek	4	900	22.500				
Joiner Creek	1	200	5.000	5060	(See Mill Creek)		
Clear Creek	9	7,000	175.000	5060	(See Mill Creek)		
Silver Creek	1	40	1.000				
Parker's Canyon Creek	1	300	7.500				
Unnamed Springs	3	155	3.875				
Swamp Creek	1	200	5.000	5060	(See Mill Creek)		
Perdee Creek	1	100	2.500				
Slough or Swamp	1	All	———				
Unnamed Spring	1	40	1.000				
Whitcraft (Gulch) Creek	1	All	———				
Unnamed Creek	2	300	7.500				
Cook's Creek	1	75	1.875				
Warm Springs Creek	78	144,514	3,612.850	2495	72	25,008	625.200
Middle Fork	(See Warm Springs Creek)						
South Branch	(See Warm Springs Creek)						
West Fork	(See Warm Springs Creek)						
Cable Creek	3	6,200	155.000				
North Branch	1	200	5.000				
Northwest Fork	0	0	0				
Stoner Spring	1	300	7.500				
Unnamed Spring	1	All	———				

WATER RIGHT DATA — DEER LODGE COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

Streams	Appropriations (Filings of Record)			Decreed Rights			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Storm Lake (Arastra) Creek	9	25,900	647.500	2495	(See Warm Springs Cr.)		
Storm Lake	6	15,800	395.000	2495	(See Warm Springs Cr.)		
Lagger's (Gulch) Creek	1	120	3.000				
Twin Lakes Creek	12	46,100	1,152.500	2495	(See Warm Springs Cr.)		
Twin Lakes	8	18,400	460.000	2495	(See Warm Springs Cr.)		
E. Fork Twin Lakes Creek	2	5,000	125.000				
Four Mile Creek	3	24,100	602.500				
Davis Lake	3	8,000	200.000				
Lower Four Lake	1	3,000	75.000				
Nelson (Gulch) Creek	1	1,000	25.000				
Foster Creek	4	6,300	157.500				
East Fork	2	100	2.500				
Johnson (Gulch) Creek	1	500	12.500				
Barker Creek	7	13,500	337.500				
East Fork	1	2,000	50.000				
Lake Crown	1	2,400	60.000				
Lake Foyle	1	1,700	42.500				
Lake Hope	1	1,200	30.000				
Summit Lake	3	5,000	125.000				
West Fork	3	5,500	137.500				
Oleson (Gulch) Creek	7	630	15.750				
East Fork (Buck Gulch Creek)	1	All	———				
Unnamed Springs	4	4,212	105.300				
Unnamed Creek	2	400	10.000				
Jordan Spring	1	300	7.500				
Unnamed Springs	3	720	18.000				
Boomerang (Gulch) Creek	6	330	8.250				
East Fork	0	0	0				
Unnamed Spring	1	5	.125				
Springs, Ponds & Lakes	1	500	12.500	2495	(See Warm Springs Cr.)		
Josephine Spring	1	40	1.000				
Stumptown (Stump City) Spring	2	120	3.000				
Haggin Creek (Spring Gulch Creek)	4	900	22.500				
East Fork	1	200	5.000				
West Fork	1	300	7.500				
Haggin Lake	3	86,000	2,150.000				
Stuckey (Gulch) Creek	1	All	———	2495	(See Warm Springs Cr.)		
Dry (Gulch) Creek	0	0	0				
Unnamed Springs	2	140	3.500				
Unnamed Springs	3	10	.250				

WATER RIGHT DATA — DEER LODGE COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

Streams	Appropriations (Filings of Record)			Decreed Rights			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Creek	1	40	1.000				
Levengood (Gulch) Creek	3	155	3.875	2495	(See Warm Springs Cr.)		
Unnamed Spring	1	40	1.000				
Unnamed Spring	1	50	1.250				
English Gulch (Shepherd) Creek	0	0	0				
Unnamed Springs	3	760	19.000				
Nates (Ice House) Gulch Creek	1	500	12.500	2495	(See Warm Springs Cr.)		
Three Lakes	1	All	———				
Unnamed Spring	1	50	1.250				
Hearst (Gray's Gulch) Creek	2	1,600	40.000	2495	(See Warm Springs Cr.)		
Hearst Lake	2	5,000	125.000	2495	(See Warm Springs Cr.)		
Lake Baldy	1	All	———				
Unnamed Springs	2	920	23.000				
Fifer Gulch (Martha) Creek	3	800	20.000	2495	(See Warm Springs Cr.)		
Glover's Gulch (Sailes) Creek	2	140	3.500	2495	(See Warm Springs Cr.)		
Sheep (Gulch) Creek	9	630	15.750				
Silver Spring	1	All	———				
Unnamed Spring	1	100	2.500				
Dry (Gulch) Creek	0	0	0				
Two Springs	1	100	2.500				
Birch Street (Gulch) Creek	1	All	———				
Sewage & Waste	6	9,280	232.000				
Unnamed Spring	1	16	.400				
Unnamed (Gulch) Creek	1	5	.125				
Unnamed (Gulch) Creek	1	6	.150				
Slaughterhouse (Gulch) Creek	0	0	0				
Unnamed Springs	1	All	———				
Golden Spring	1	40	1.000				
Sheep Camp Creek (Girard Gulch Creek)	3	650	16.250				
Perkins (Gulch) Creek	2	40	1.000				
East Branch	1	120	3.000				
North Fork	2	280	7.000				
Dutchman Creek	4	2,620	65.500	2495	(See Warm Springs Cr.)		
Waste	1	500	12.500				
Lansing Slough	1	280	7.000				
Sand Creek	0	0	0				
North Fork	1	120	3.000				

WATER RIGHT DATA — DEER LODGE COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

Streams	Appropriations (Filings of Record) No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Decreed Rights Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
South Fork	1	120	3.000				
Berryman's Spring	1	40	1.000				
Lost Creek	34	26,656	666.400	1982	40	9,083.995	227.099875
Lost Creek Lake	2	160	4.000				
Landry Bessette Spring	1	20	.500				
Unnamed Creek & Spring	1	150	3.750				
Hatter's (Gulch) Creek	0	0	0				
Unnamed Spring	2	260	6.500				
Timber (Gulch) Creek	3	300	7.500	4099	(See Antelope Creek)		
Unnamed Spring	1	160	4.000				
Unnamed Springs	6	600	15.000				
Coal (Gulch) Creek	0	0	0				
Coal Gulch Spring	1	36	.900				
Sheep Gulch (Hoodoo) Creek	1	80	2.000				
Unnamed Spring	1	40	1.000				
Antelope Creek	3	2,060	51.500	4099	5	173	4.325
Unnamed Springs	2	40	1.000				
Spring (Gulch) Creek	5	8,470	211.750				
Prairie (Gulch) Creek	4	2,600	65.000				
Buck's (Gulch) Creek	0	0	0				
Unnamed Spring	1	100	2.500				
Unnamed Springs	7	290	7.250				
Swamp	1	20	.500				
Unnamed Springs	3	370	9.250				
Unnamed (Gulch) Creek	0	0	0				
Liffring Spring	1	160	4.000				
Dry Cottonwood Creek	10	14,884	372.100				
Fork of Dry Cottonwood Creek	(See Dry Cottonwood Cr.)						
North Fork	4	2,020	50.500				
South Fork	1	200	5.000				
Unnamed Creek	1	200	5.000				
Sink (Skidoo) Creek	2	200	5.000				
Modesty (Gulch) Creek	3	0	0	5048	4	All	———
Unnamed Springs	1	All	———				
West Fork (Gibson Creek, Spring Gulch Creek)	1	80	2.000				
Unnamed Spring	1	1,000	25.000				
Wolf (Gulch) Creek	0	0	0				
Wolf Gulch Spring	1	40	1.000				
Calf Gulch (Dick's) Creek	1	50	1.250				
Unnamed Springs	5	95	2.375				

WATER RIGHT DATA — DEER LODGE COUNTY
APPROPRIATIONS AND DECREES BY STREAMS

	Appropriations (Filings of Record)			Decreed Rights			
	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.	Case No.	No. of Decrees	Miner's Inches	Cu. Ft. Per Sec.
Unnamed Springs	4	270	6.750	4203	2	310	7.750
Waste	2	400	10.000				
Little Modesty Creek	1	320	8.000	4220	3	225	5.625
Unnamed Springs	2	200	5.000				
Waste	1	100	2.500				
Sand Hollow Creek	1	200	5.000				
Slaughterhouse Creek	1	120	3.000				
Race Track Creek	22	93,465	2,336.625	2749	17	3,823.17	95.579250
Mud Lake	1	160	4.000				
Unnamed Springs	1	50	1.250				
Race Track Lake	3	1,600	40.000	2749	1	192.4 ac. ft.	
Goat Mountain (Jones) Lake	1	120	3.000	2749	1	225.8 ac. ft.	
North Fork & Large Lake	2	6,000	150.000				
North Fork & Small Lake	1	3,000	75.000				
Pozega (Deep) Lake No. 1	1	1,200	30.000	2749	1	376 ac. ft.	
Pozega Lake No. 2	0	0	0	2749	1	37.5 ac. ft.	
Bowman (Three) Lakes	2	360	9.000				
Left Fork	1	1,000	25.000				
Lake above Thornton Lake	1	100	2.500				
Thornton Lake	3	1,000	25.000	2749	1	179.4 ac. ft.	
Oro Fino (Gulch) Creek	10	2,950	73.750				
Unnamed Springs	2	100	2.500				
Mountain View Spring	1	50	1.250				
Hell Gate River (Clark Fork of Columbia)	0	0	0				
Flint Creek	0	0	0				
Silver Lake	5	10,600	265.000				
Daly's (Gulch) Creek	1	16	.400				
East Fork	1	25	.625				
Unnamed Springs	2	107	2.675				
Young Ireland (Gulch) Creek	1	16	.400				
Georgetown Lake	0	0	0				
Blodgett (Dry) Creek	1	80	2.000				
Silver Hill (Lost) Creek	4	2,100	52.500				
Mill Spring (Stewart) Creek	2	1,600	40.000				
Stewart Mill (Stewart's) Spring	2	1,750	43.750				
Willow Spring	1	4	.100				
North Fork	0	0	0				
Echo Lake Creek	1	50	1.250				
Hazel Spring	1	10	.250	2656	1	All	
Unnamed Springs	4	900	22.500				
TOTAL	**558**	**707,375**	**17,684.375**		**198**	**49,632.165**	**1240.804125**

NOTE: Race Track Creek is located in both Deer Lodge and Powell Counties. The number of decrees listed on Race Track Creek pertain to Deer Lodge County only.

WATER RIGHT DATA—DEER LODGE COUNTY

APPROPRIATIONS AND DEECREES BY STREAMS

Streams	No. of Filings	Miner's Inches	Cu. Ft. Per Sec.
Drainages Not Located in Deer Lodge County.			
Clarden Creek	1	300	7.500
Cold Spring	1	100	2.500
Dutch Creek	1	520	13.000
Elk Creek	1	400	10.000
Hane Creek	1	100	2.500
Hinze Spring	1	100	2.500
Lake Brown	1	3,000	75.000
Lake Donohoe	2	5,000	125.000
Lake Fish	2	6,000	150.000
Lake George	2	5,000	125.000
Lake Margaret	2	5,000	125.000
Lake McGroarty	1	2,000	50.000
Lake Senora	2	4,000	100.000
Lake Surprise	1	700	17.500
McGroarty Spring & Creek	1	1,000	25.000
Morrison Spring	1	All	———
North Fork Creek	1	120	3.000
Old Man Creek	1	———	———
Ontario Spring	1	300	7.500
Unnamed Creeks	5	134	3.350
Unnamed Lake	1	4,320	108.000
Unnamed Springs	5	1,190	29.750
Walsh Creek	1	———	———
TOTAL	**36**	**39,284**	**982.100**

WATER RESOURCES SURVEY

Deer Lodge County, Montana

Part II

Maps Showing Irrigated Areas

Published by
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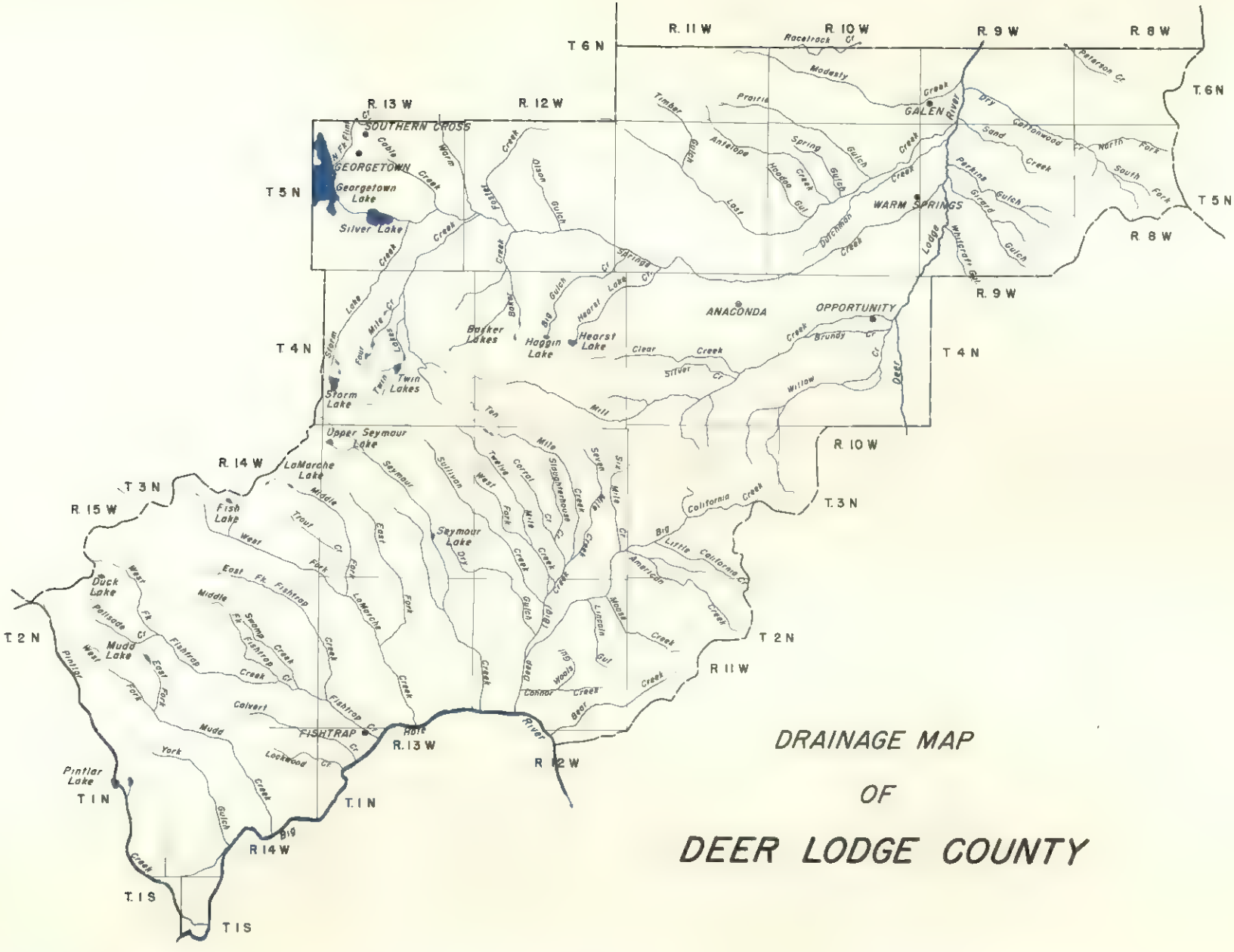
Helena, Montana
June, 1955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GEORGETOWN
Georgetown Lake
Silver Lake
GALEN
WARM SPRINGS
ANACONDA
OPPORTUNITY
Storm Lake
Twin Lakes
Upper Seymour Lake
LaMarche Lake
Fish Lake
Seymour Lake
Duck Lake
Mudd Lake
Pintlar Lake
FISHTRAP
Racetrack Cr.
Peterson Cr.
Modesty Creek
Timber Gulch
Prairie Creek
Dry Cottonwood Cr.
North Fork
South Fork
Sand Creek
Antelope Spring Gulch
Hoodoo Creek
Perkins Gulch
Grand Gulch
Lodge Gulch
Whitetail Gulch
Olson Gulch
Foster Creek
Warm Springs Creek
Cable Creek
Georgetown Creek
Storm Lake Cr.
Four Mile Lakes
Twin Lakes Cr.
Baker Lakes
Haggin Lake
Hearst Lake
Big Hearst Lake Cr.
Clear Creek
Silver Cr.
Brandy Cr.
Deer Creek
Willow Creek
Ten Mile Creek
Seymour Creek
Sullivan Creek
West Fork Mile Cr.
Twelve Mile Creek
Coral Creek
Sixteen Mile Creek
Seven Mile Cr.
Middle Fork
Trout Cr.
East Fork
West Fork
East Fk. Fishtrap Creek
Middle Fk. Fishtrap Creek
West Fk. Fishtrap Creek
Palisade Cr.
Pintlar Creek
Calvert Creek
Mudd Creek
York Creek
Lockwood Cr.
Fishtrap Cr.
Big Hole River
California Creek
Big Little California Cr.
American Creek
Woods Gulch
Lincoln Gulch
Deadman Gulch
Connor Creek
Bear Creek
Big Hole River
Pintlar Creek
Big Creek
Gulch
DRAINAGE MAP
OF
DEER LODGE COUNTY

MAP INDEX

MAP SYMBOL INDEX

BOUNDARIES

- COUNTY LINE
- NATIONAL FOREST LINE

DITCHES

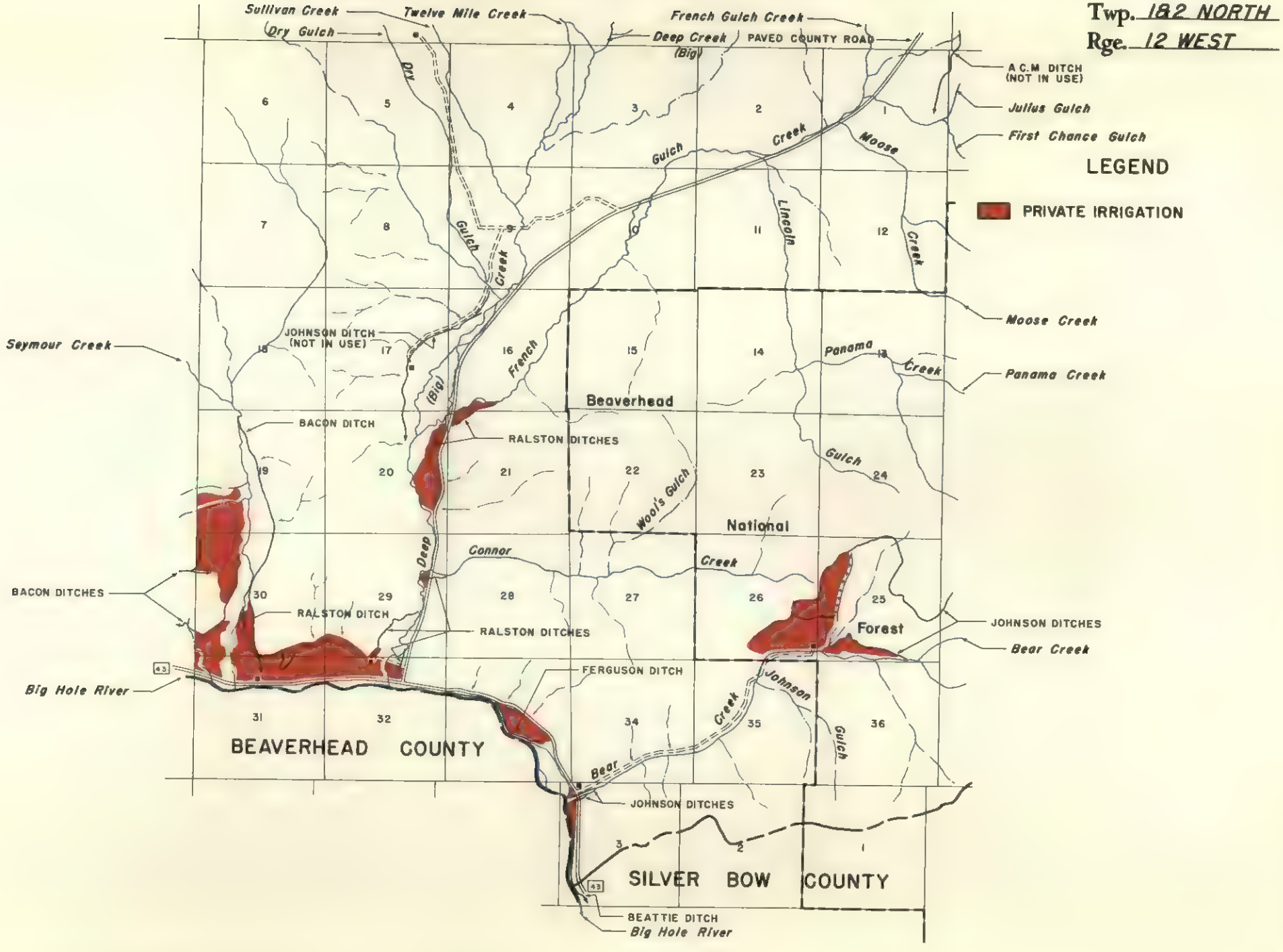
- CANALS OR DITCHES
- DRAIN DITCHES
- PROPOSED DITCHES

TRANSPORTATION

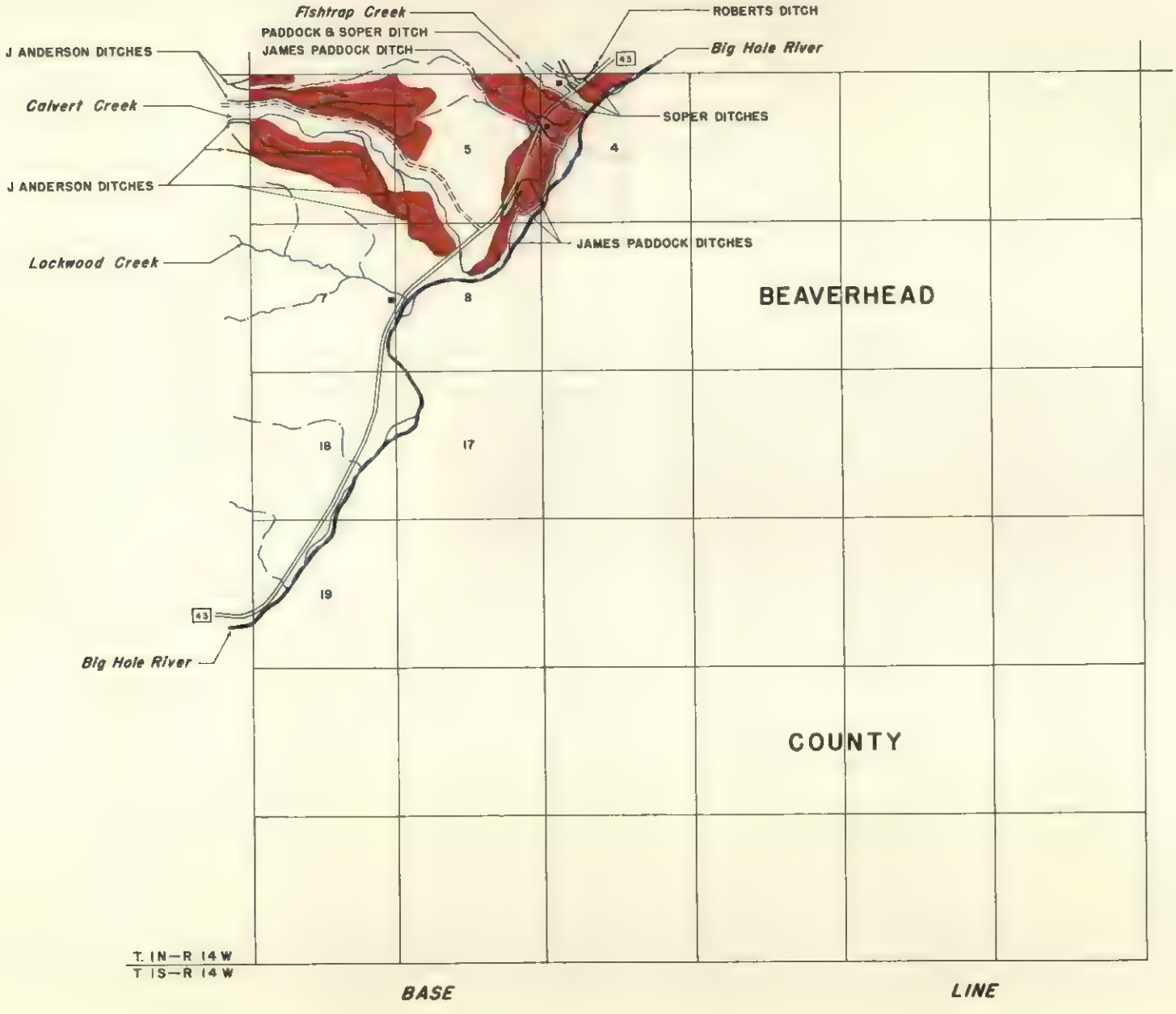
- PAVED ROADS
- UNPAVED ROADS
- RAILROADS
- STATE HIGHWAY
- U. S. HIGHWAY
- AIRPORT

STRUCTURES & UNITS

- DAM
- DIKE
- FLUME
- SIPHON
- SPILL
- SPRINKLER SYSTEM
- WEIR
- PIPE LINE
- PUMP
- PUMP SITE
- RESERVOIR
- WELL
- NATURAL CARRIER USED AS DITCH
- SPRING
- SWAMP
- GAUGING STATION
- POWER PLANT
- STORAGE TANK
- CEMETERY
- FAIRGROUND
- FARM OR RANCH UNIT
- LOOKOUT STATION
- RANGER STATION
- RAILROAD TUNNEL
- SCHOOL
- SHAFT, MINE, OR DRIFT


Twp. 182 NORTH
Rge. 12 WEST
Sullivan Creek
Twelve Mile Creek
French Gulch Creek
Dry Gulch
Deep Creek (Big)
PAVED COUNTY ROAD
A.C.M. DITCH (NOT IN USE)
Julius Gulch
First Chance Gulch
Moose Creek
Lincoln Creek
Dry Gulch Creek
LEGEND
PRIVATE IRRIGATION
Seymour Creek
JOHNSON DITCH (NOT IN USE)
Moose Creek
Panama Creek
Beaverhead
BACON DITCH
RALSTON DITCHES
Wool's Gulch
National
Connor Creek
Deep
BACON DITCHES
RALSTON DITCH
RALSTON DITCHES
JOHNSON DITCHES
Forest
Bear Creek
FERGUSON DITCH
Big Hole River
Johnson Creek
Bear Gulch
BEAVERHEAD COUNTY
JOHNSON DITCHES
SILVER BOW COUNTY
BEATTIE DITCH
Big Hole River

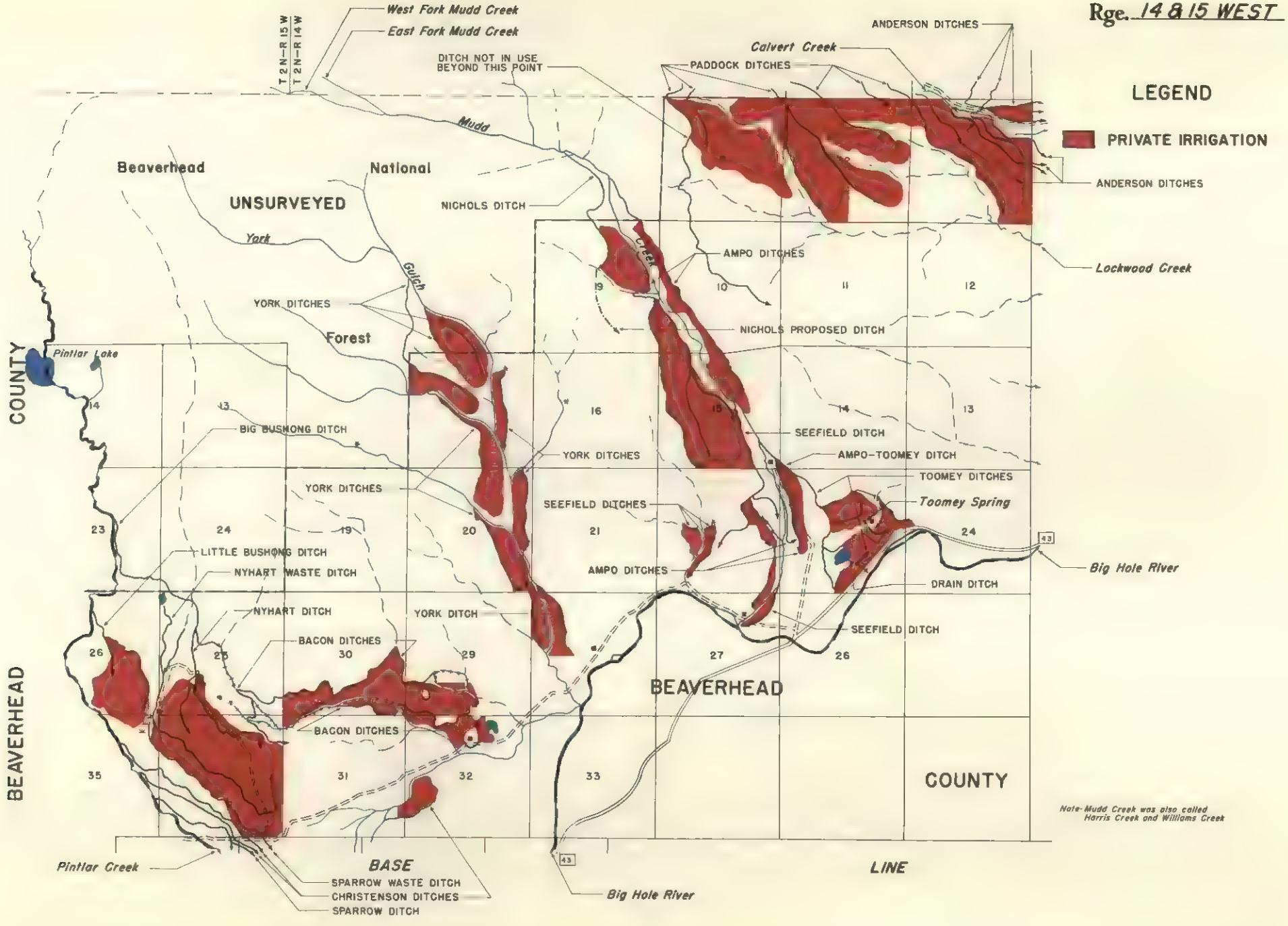
Twp. 1 NORTH
Rge. 13 WEST



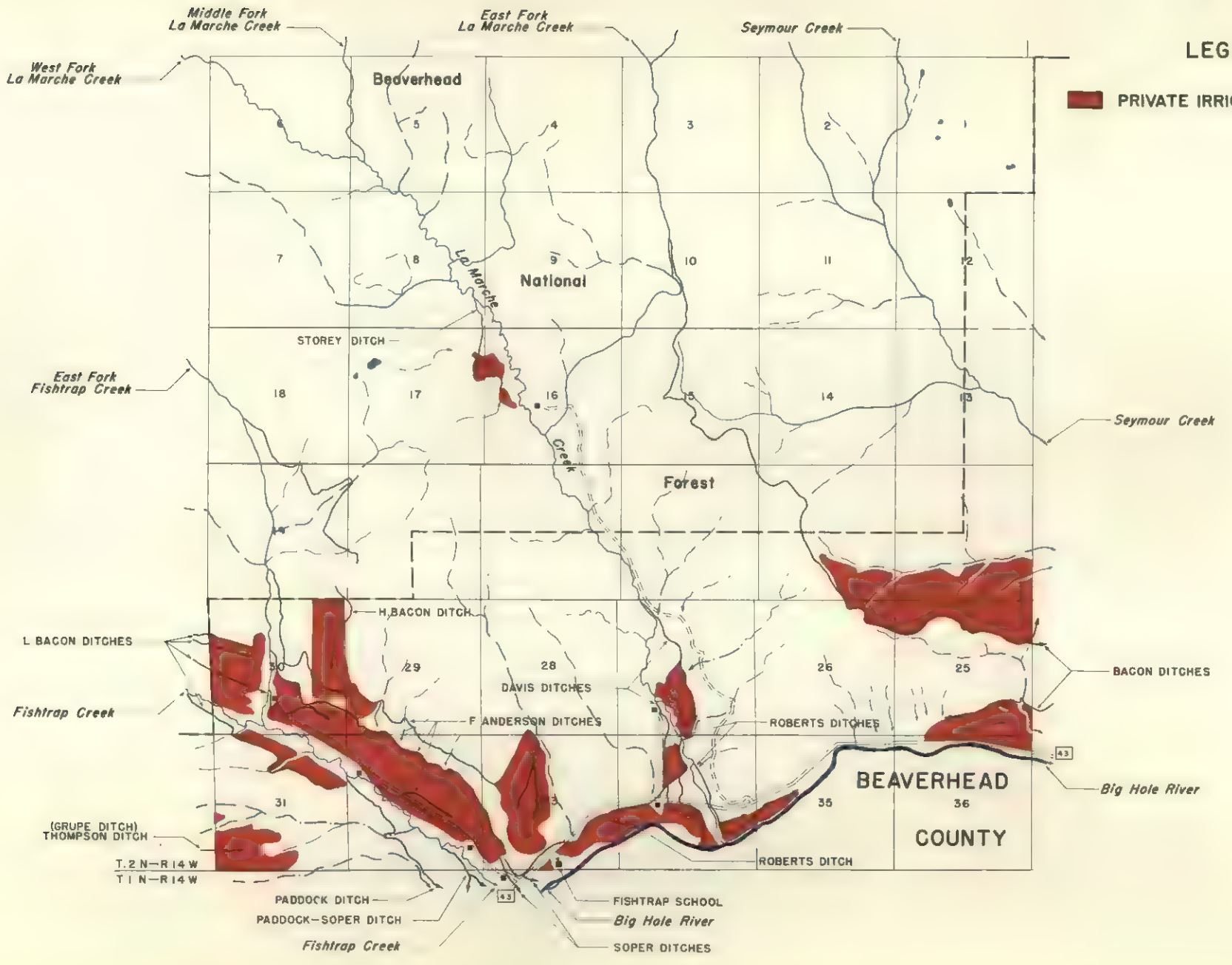
LEGEND

PRIVATE IRRIGATION

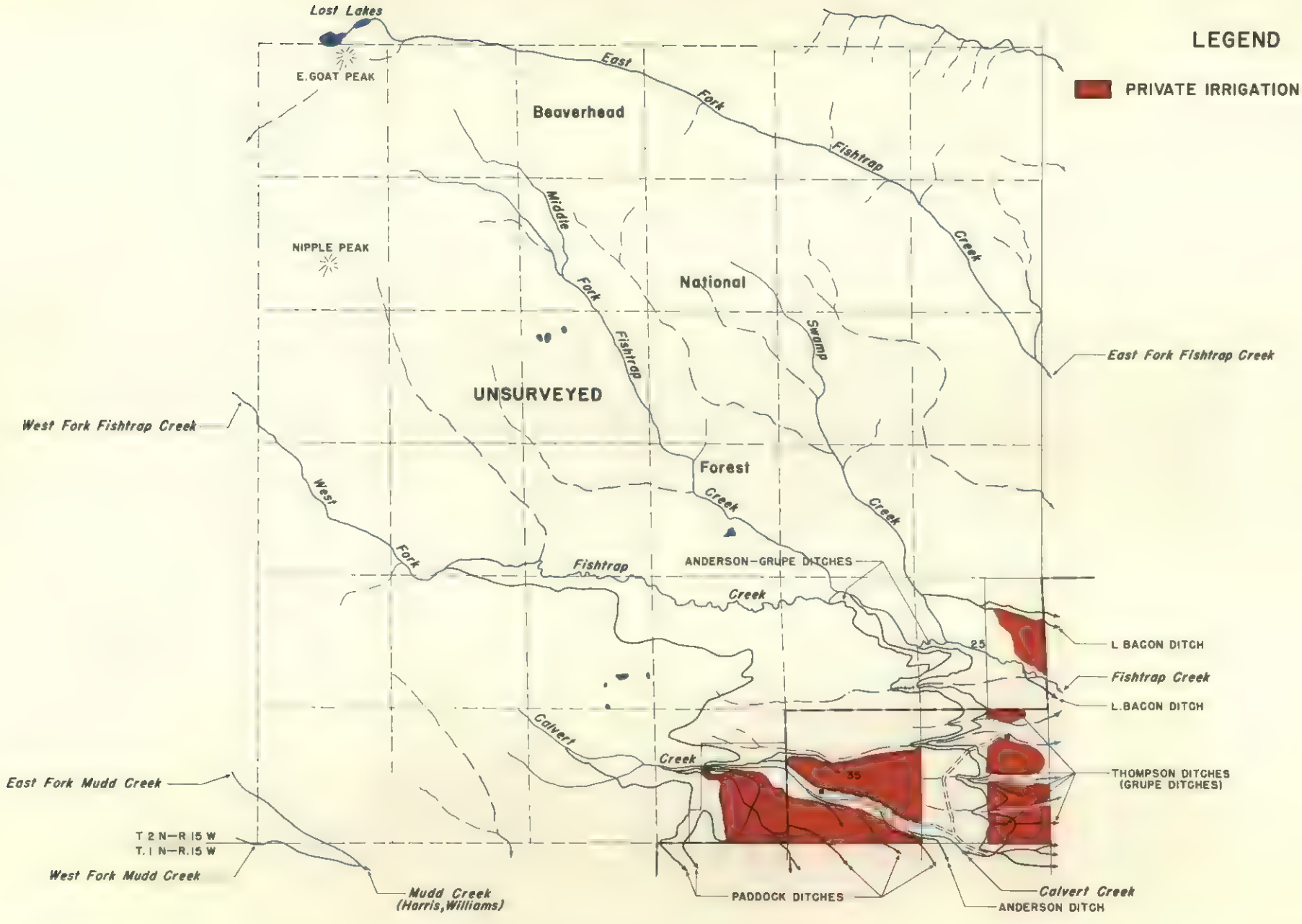
Twp. 1 NORTH
Rge. 14 & 15 WEST



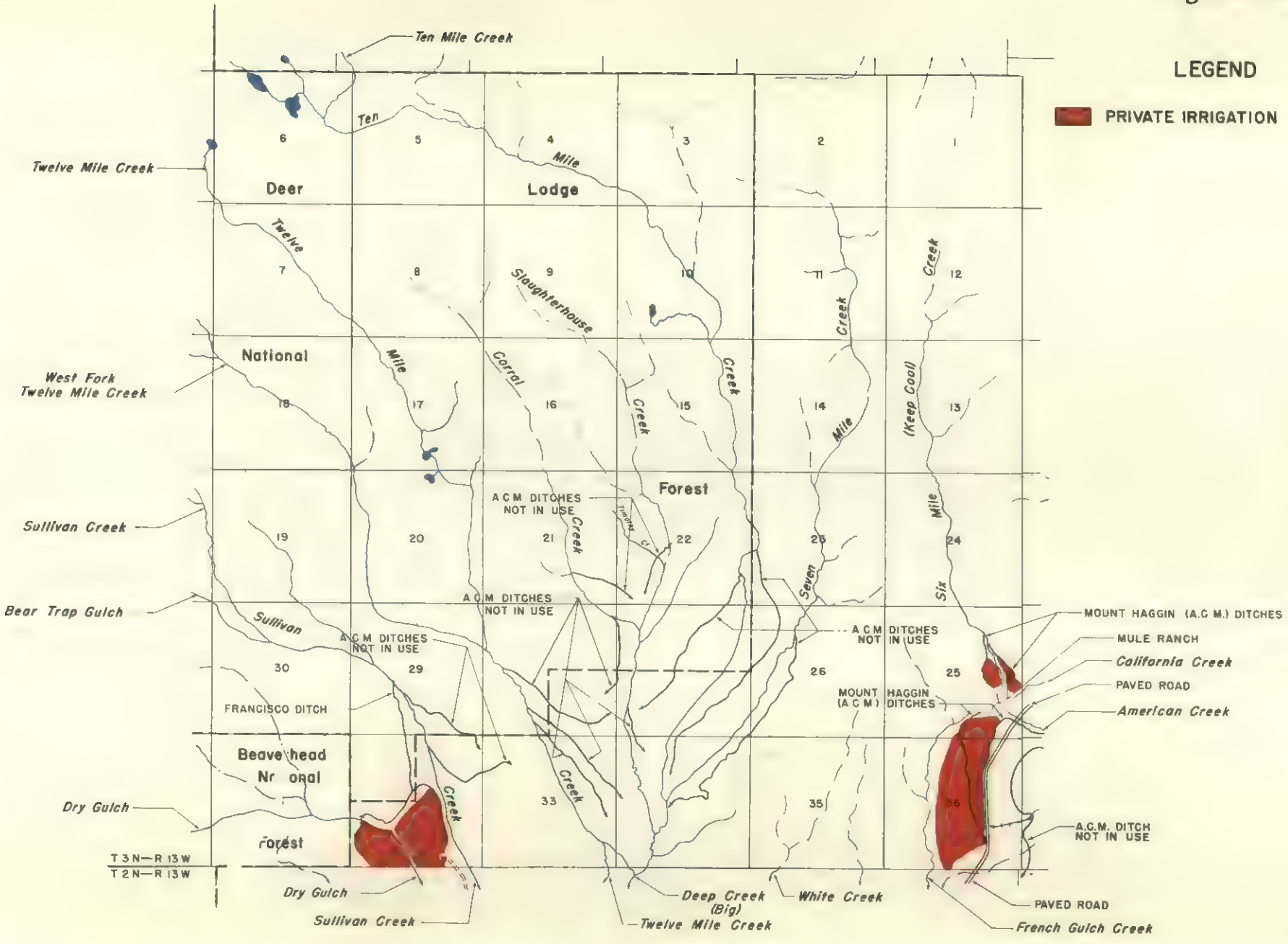
Twp. 2 NORTH
Rge. 13 WEST



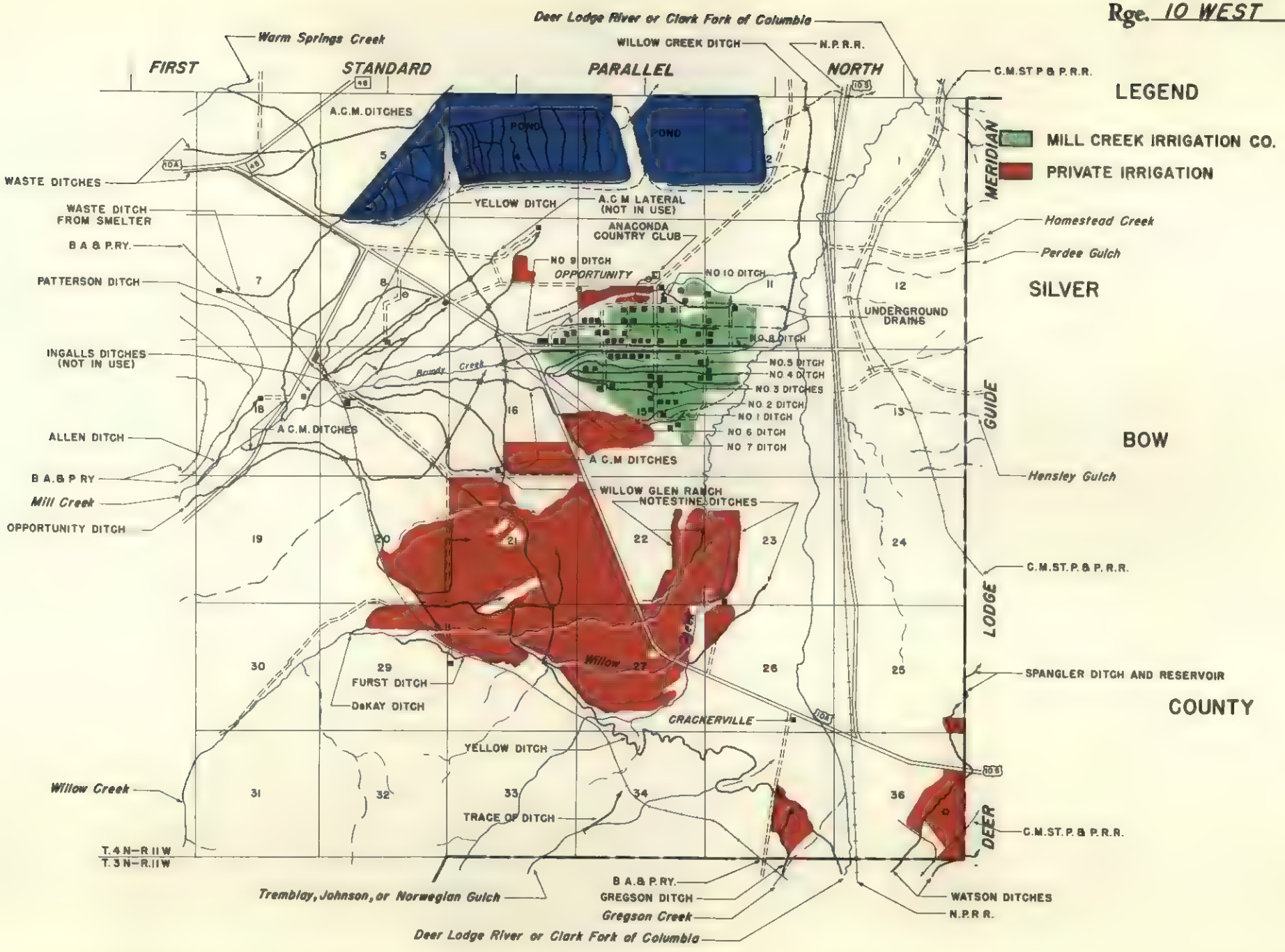
Twp. 2 NORTH
Rge. 14 WEST



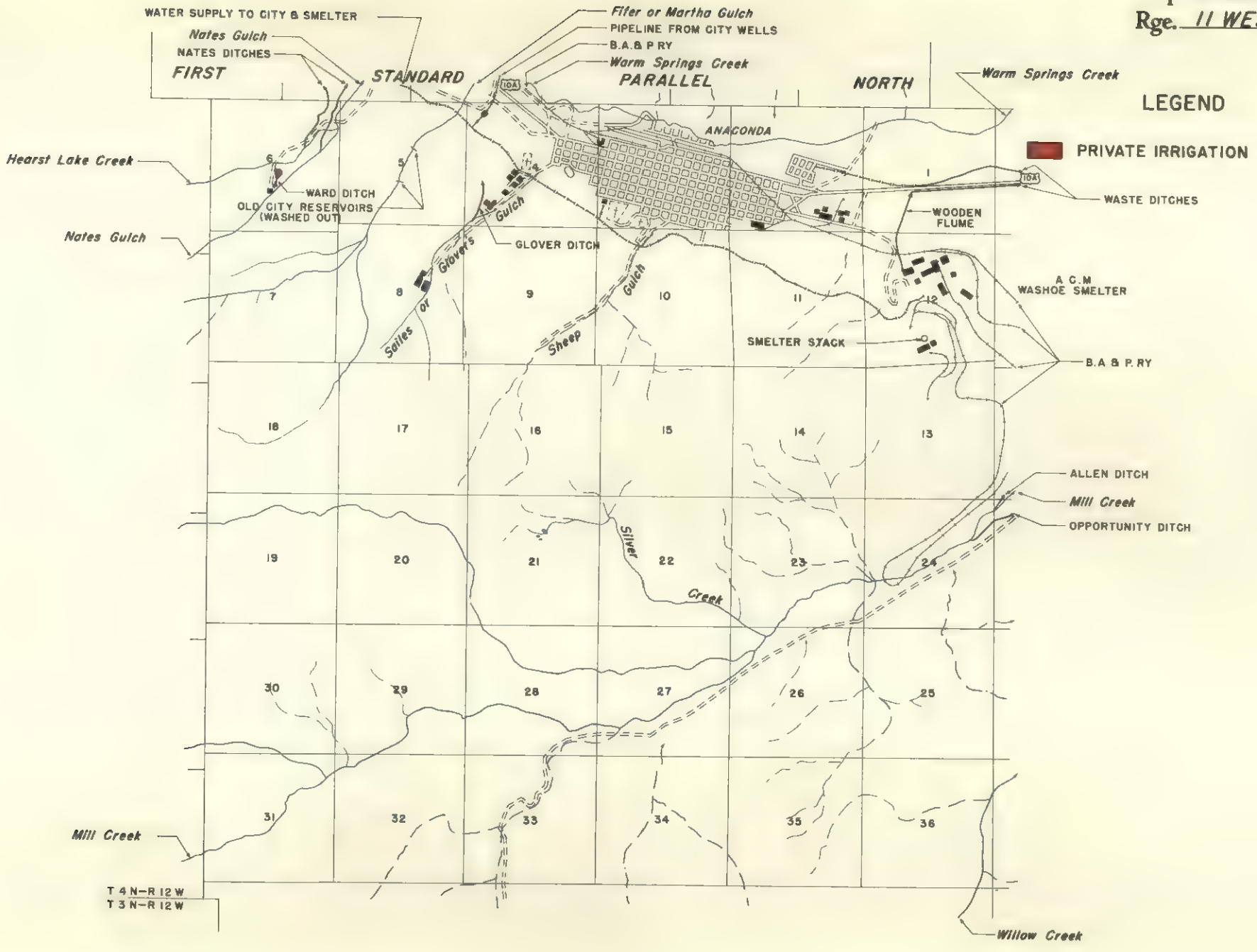
Twp. 3 NORTH
Rge. 12 WEST



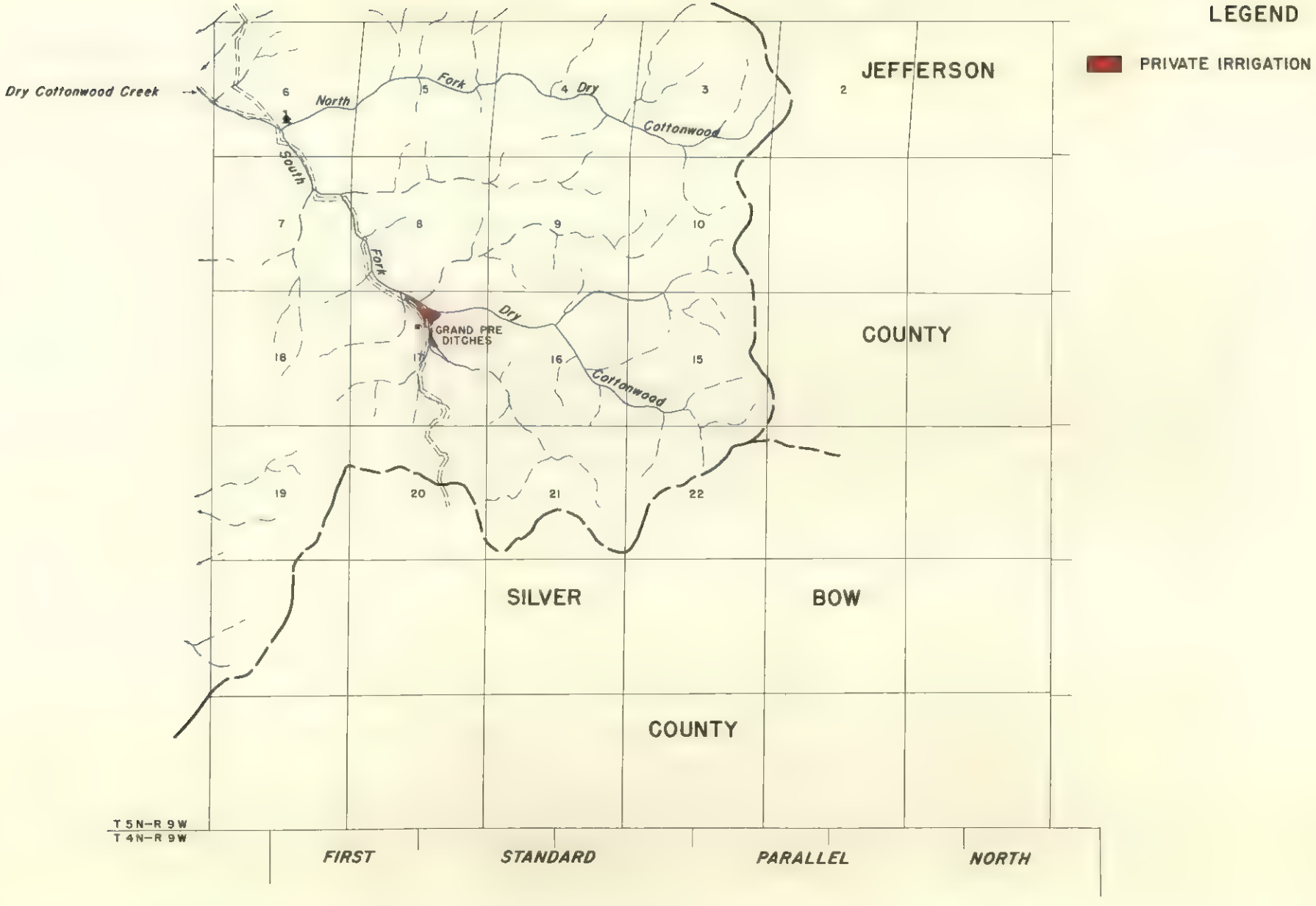
Twp. 4 NORTH
Rge. 10 WEST



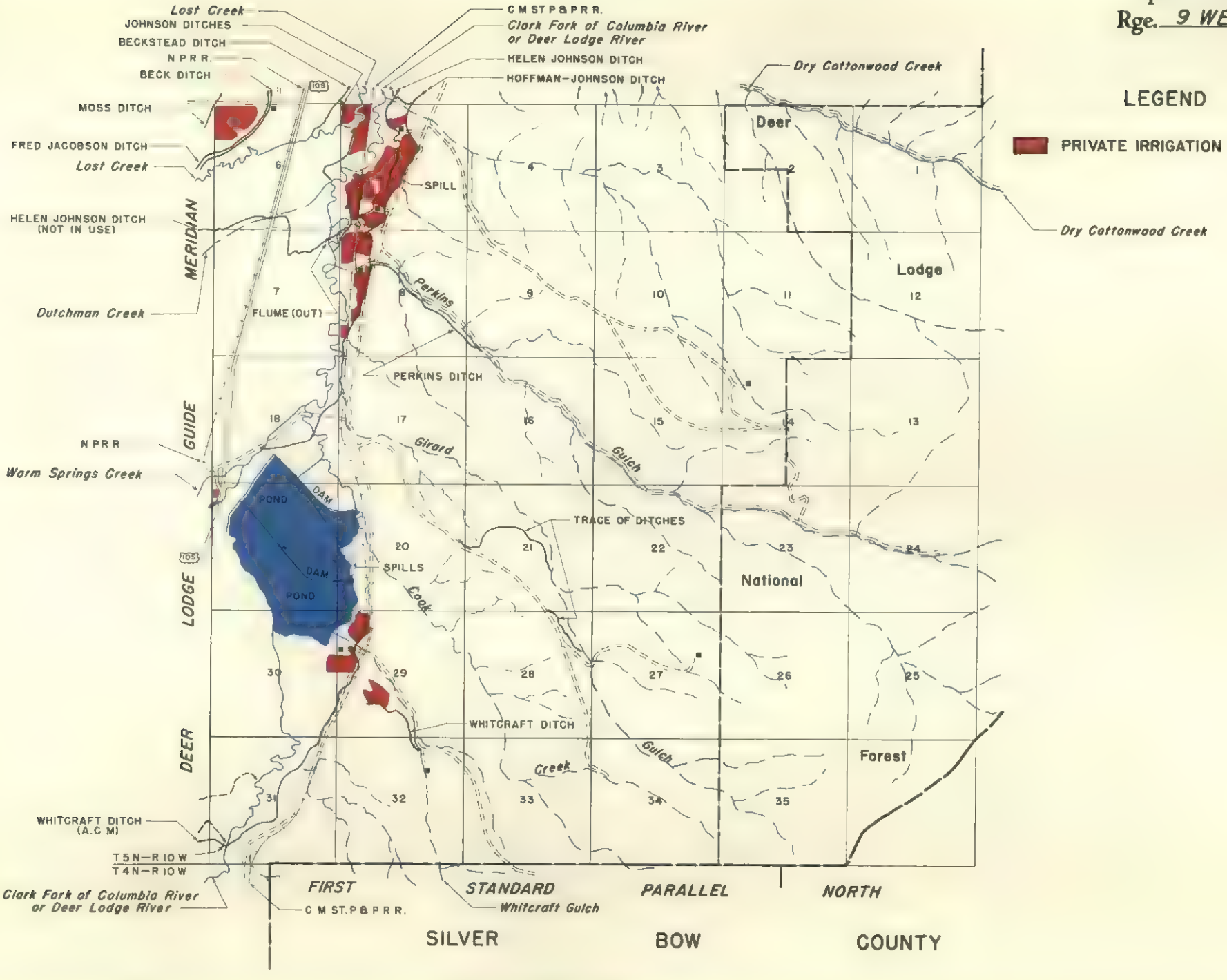
Twp. 4 NORTH
Rge. 11 WEST



Twp. 5 NORTH
Rge. 8 WEST



Twp. 5 NORTH
Rge. 9 WEST



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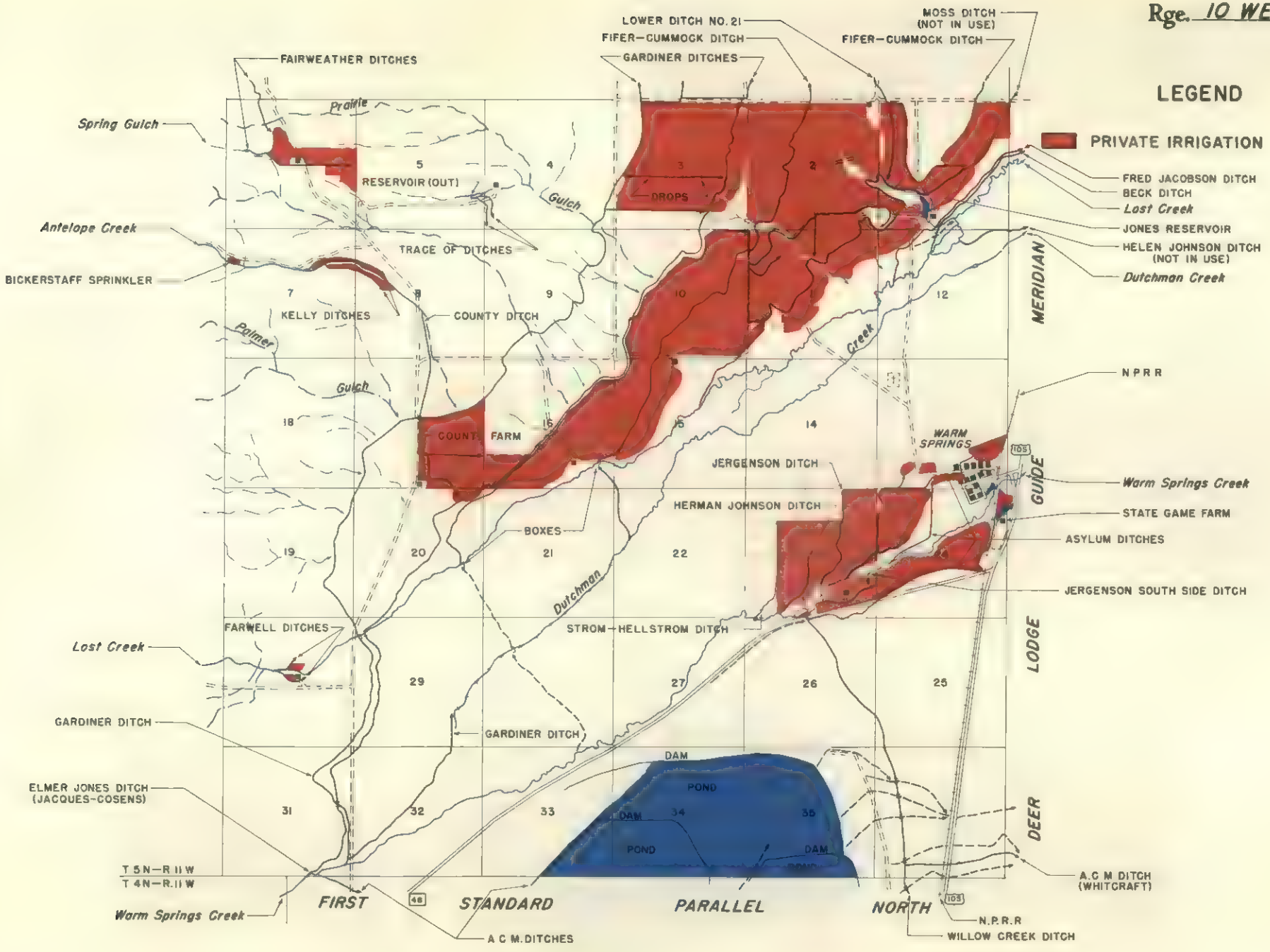
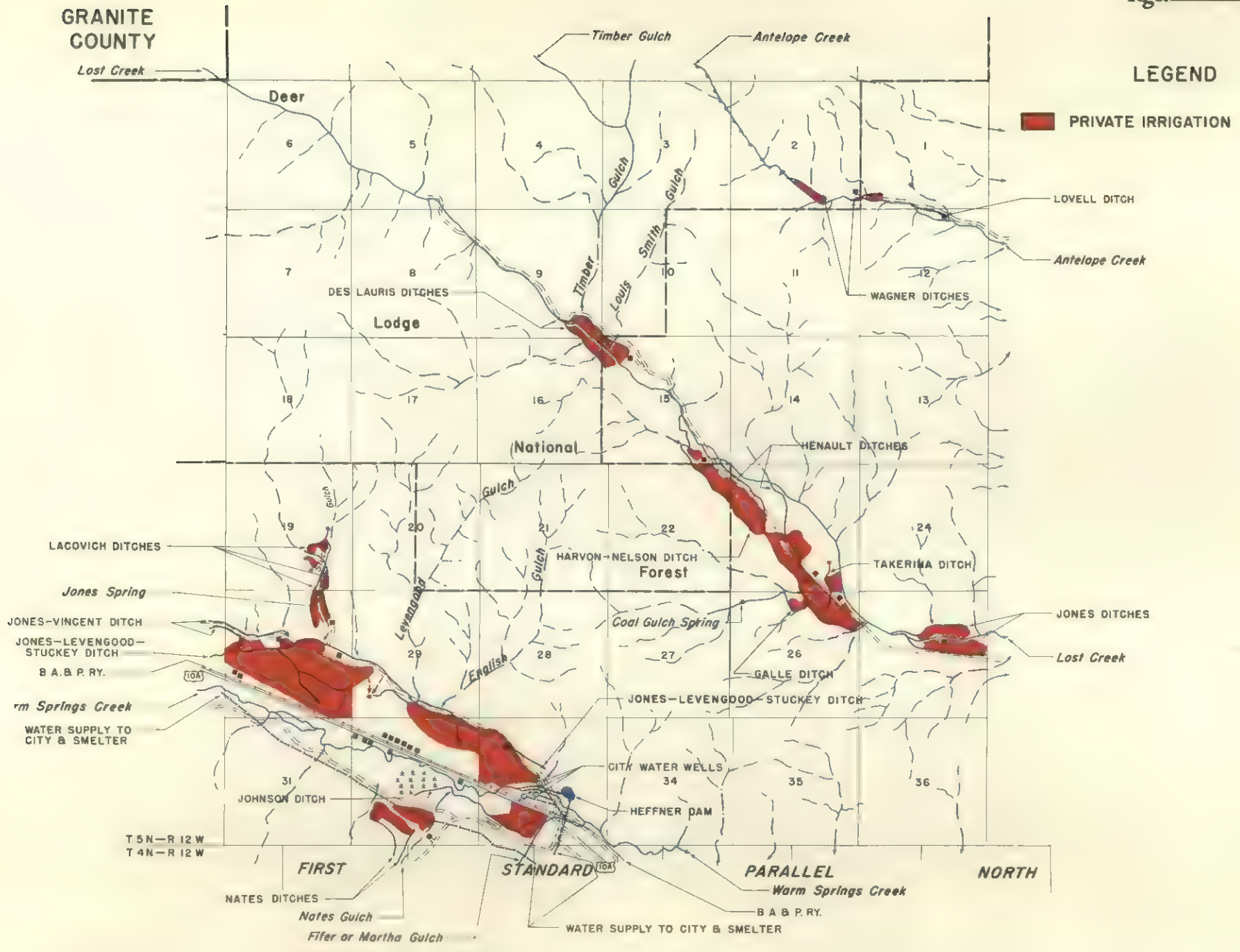
Rge. 10 WEST

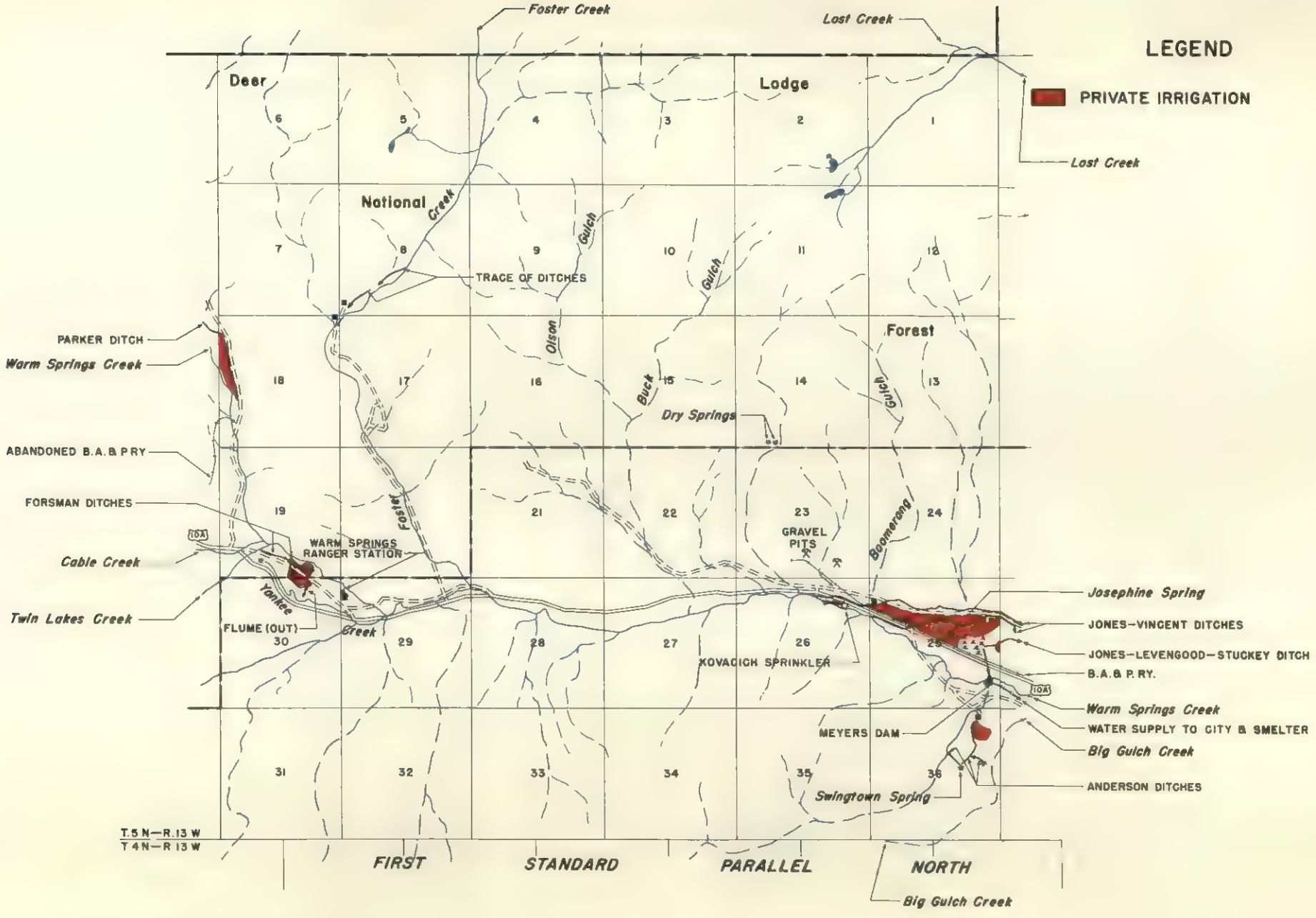


Twp. 5 NORTH
Rge. 11 WEST

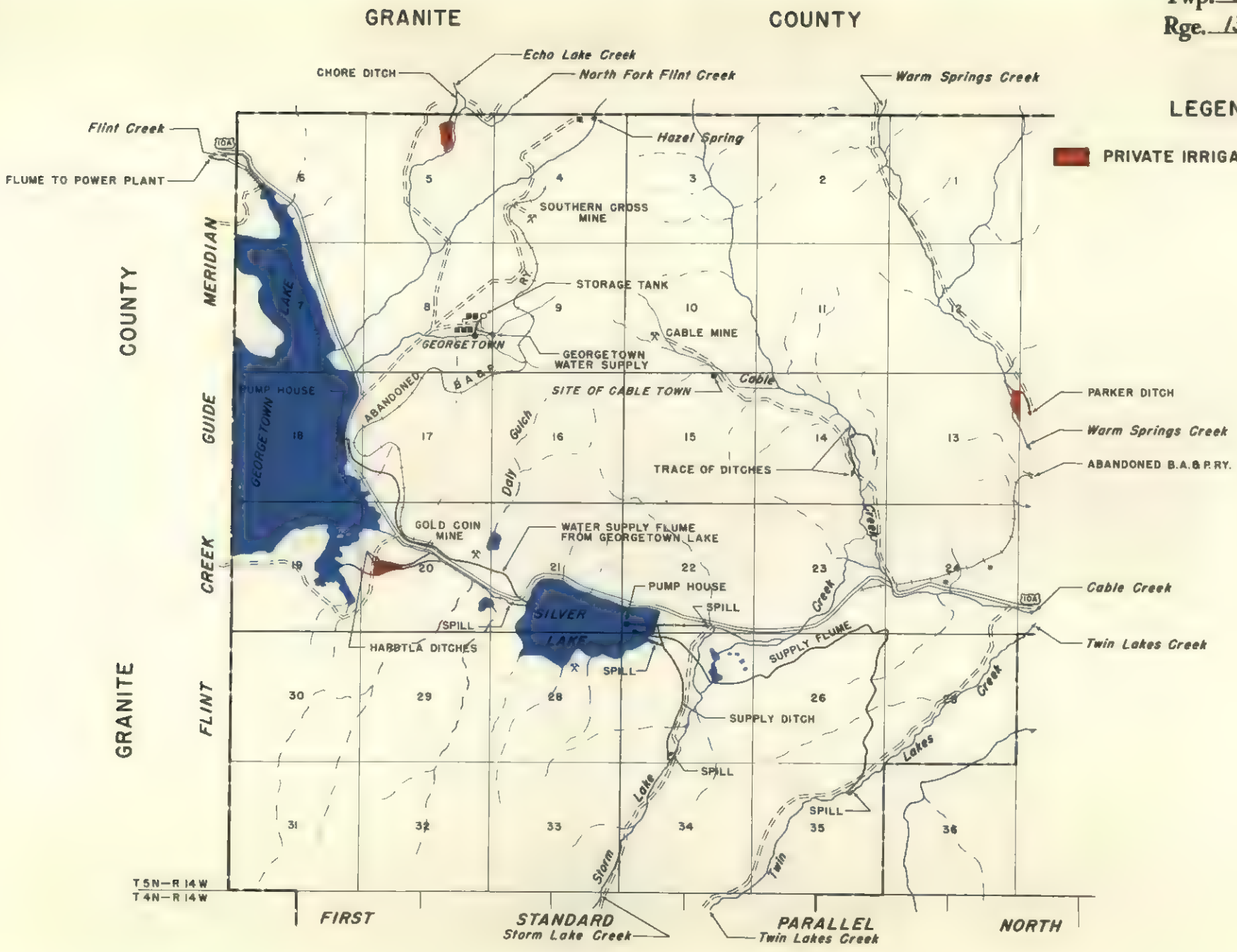


Twp. 5 NORTH
Rge. 12 WEST

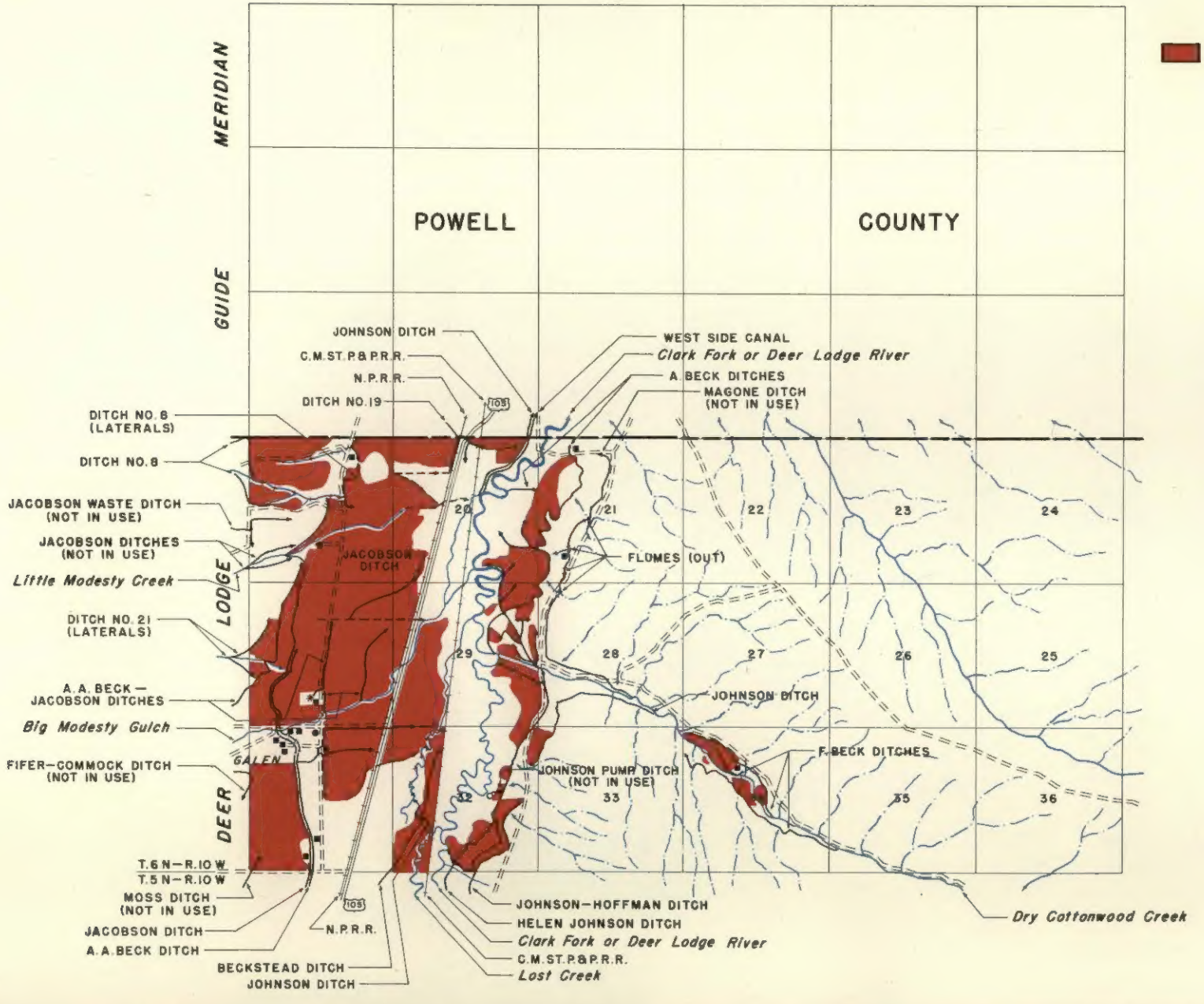
GRANITE COUNTY



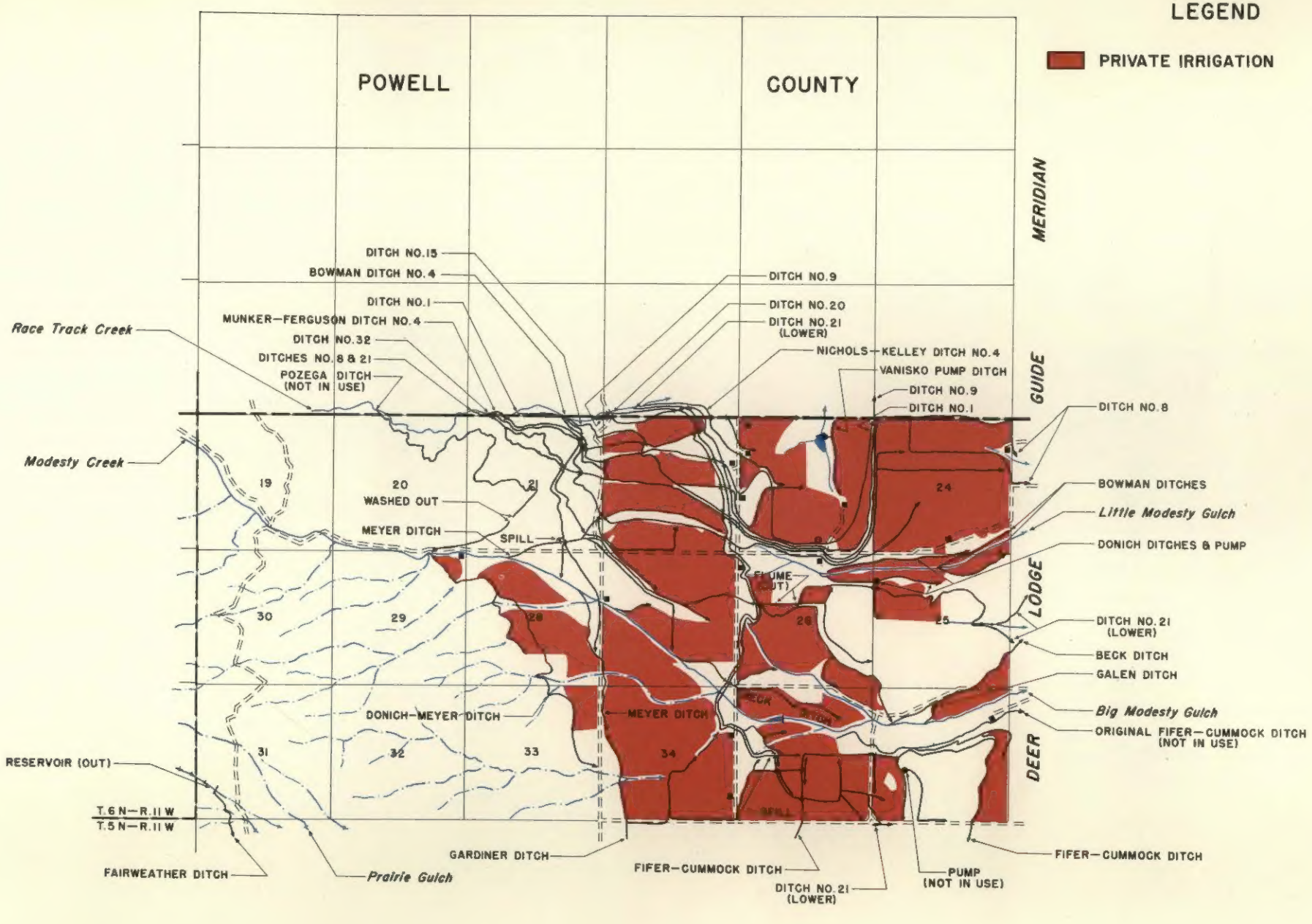
Twp. 5 NORTH
Rge. 13 WEST



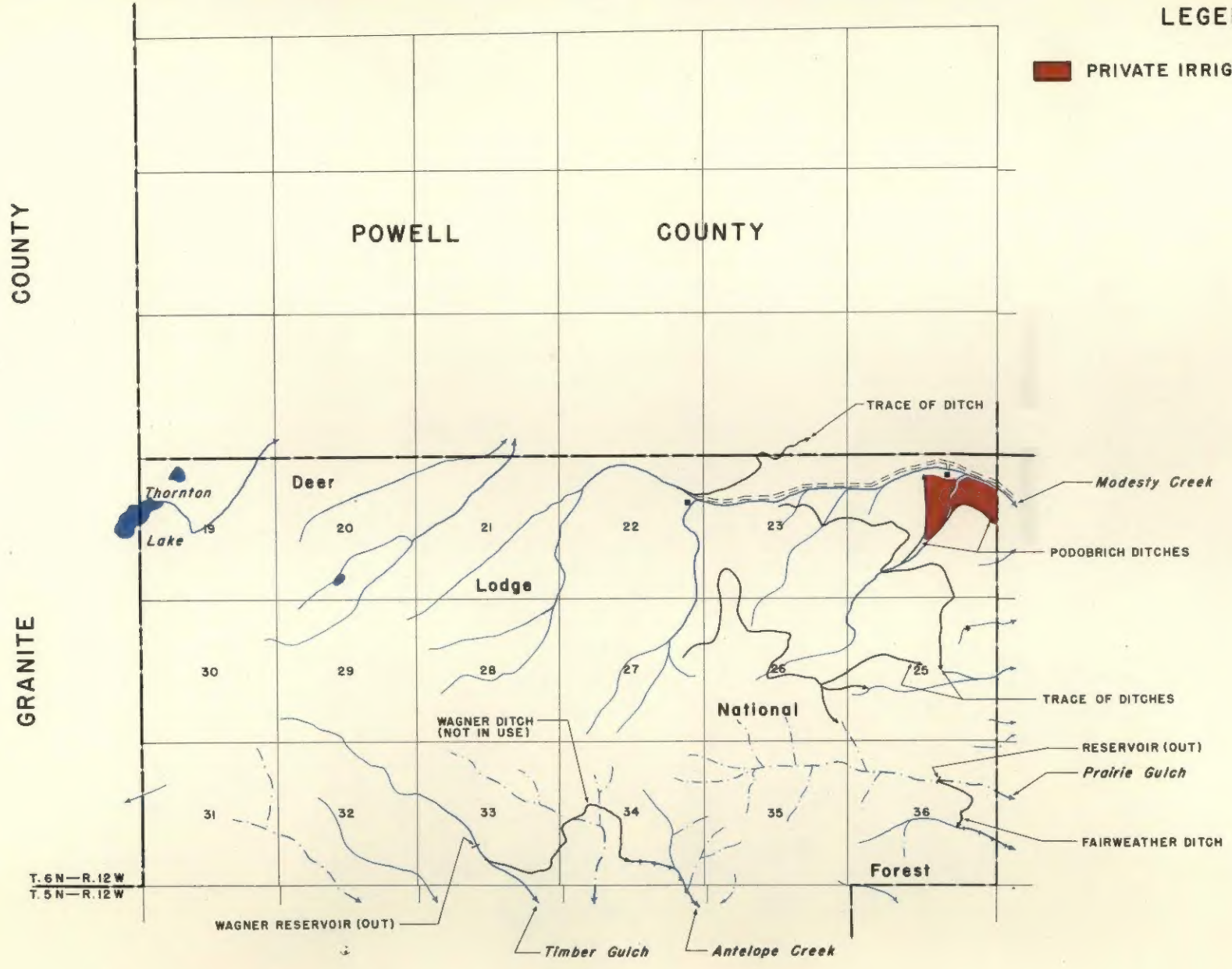
Twp. 6 NORTH
Rge. 9 WEST



Twp. 6 NORTH
Rge. 10 WEST



Twp. 6 NORTH
Rge. 11 WEST



Twp. 1 SOUTH
Rge. 14 & 15 WEST

LEGEND

PRIVATE IRRIGATION